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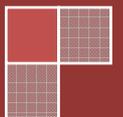
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Volume 2

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Prof. Dr. J. Ana Donaldson - AECT President
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Message from the Editor-in-Chief

Dear Colleagues,

We are very pleased to publish Special Issue Volume 2 for INTE-2018, ITICAM 2018 & IDECA 2018 conferences. This issue covers the papers presented at International Conference on New Horizons in Education, International Trends and Issues in Communication & Media Conference and International Distance Education Conference which were held in Paris, France. These papers are about different research scopes and approaches of new developments and innovation in education, communication, media and technology.

Call for Papers

TOJET invites you article contributions. Submitted articles should be about all aspects of educational technology. The articles should be original, unpublished, and not in consideration for publication elsewhere at the time of submission to TOJET. Manuscripts must be submitted in English. TOJET is guided by its editors, guest editors and advisory boards. If you are interested in contributing to TOJET as an author, guest editor or reviewer, please send your CV to tojet.editor@gmail.com.

November, 2018

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Learning System to Aid Medical Decision-Making

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Abstract

In this paper, we discuss the extraction of knowledge from cardiac data by implementing hidden Markov chains (HMM). This method is experimented in the field of cardiac arrhythmia recognition (ventricular, atrial and abnormal pathologies) from (Holter) long periods of ECG signal recordings, in order to evaluate its performance for such time and to prove that biological models are capable of giving good results, the results of the analysis are shown with experiments.

Introduction

The rates of mortality relative to cardiovascular diseases are high. According to the (Who, 2010), cardiovascular diseases are one of the most important causes of mortality in the world. Sudden death represents the half of deaths that have cardiac origins, the average age is between 50 and 60 years old but it can occur at any time. The mechanisms of this sudden death are principally ventricular arrhythmias with a percentage of 75% where the presence of extra systole is considered as an eventual predictor. An ECG signal is frequently used in clinic practices by cardiologists in order to determinate the origins of cardiac anomalies.

We deal in this paper the extraction of knowledge from cardiac data for implementation of a neural classifier of cardiac pathologies. Most classifiers cardiac arrhythmias developed in recent years (Yeh and al, 2009) Have Given Method (FLM) method Fuzzy Logic for analysis of ECG signals, neuronal approach (Mateo, 2011) (Chalabi, 2009).

This article is organised as follows:

At first we will give a related works in this field, and the most representative parameter of data base. As a result we will focus on the HMM method, after we give the results obtained, and finally a conclusion.

Related Works

Various methods of automatic classification of the ECG are found in the literature. We can mention the work carried out by several researchers for the detection of cardiac arrhythmias. Quiniou et al (Quiniou, 2006) used the inductive logic programming that is a machine learning technique for the recognition of chronic their system called CRS (Chronicle Recognition System) developed at France Telecom R & D Lannion, allows to treat effectively important event flows and chronic databases of consistent size. Chalabi et al (Chalabi, 2009) combined two networks (SOM: Self Organization Map and LVQ: Learning Vector Quantization) whose main goal is to have a better classification rate in a minimum time, they used the wavelet transform to extract the parameters that characterize various arrhythmic pathologies and thus constituting the bases of learning and generalization of neural networks. Hendel et al (Hendel, 2009) have proposed a diagnostic aid system for four very common cardiac arrhythmias: Extrasystole Ventricular (EV), Extrasystole Auricular (EA), Right Branch Block (BBD), and Branch Block. Left (BBG), in addition to the normal beat (N). They began by locating the QRS, P, and T waves and by calculating the temporal and morphological parameters that characterize a beat using mainly the wavelet technique. Then the implementation was done through a self-organizing map of Kohonen which is responsible for determining the type of beat according to its characteristics which gave them a classification rate of 95%. Messaoud et al (Messaoud, 2005) gave a fuzzy approach to the classification of cardiac arrhythmias in the atrial fibrillation family. Benali et al (Benali, 2009) did a knowledge extraction and classification of cardiac arrhythmias (ventricular extrasystoles, ESV) using a hybrid approach called neuro-fuzzy that combines neural networks with fuzzy logic. This approach gave a classification rate of 98.71% .Yeh et al (Yeh, 2009) gave the Fuzzy Logic Method (FLM) for the analysis of ECG signals, which classifies and distinguishes the two heartbeats. , these are normal beats and abnormal beats, the method gave a classification rate of 93.78% .Mateo et al (Mateo, 2011) used Radial Basis Function neural networks whose results were satisfactory by offering a large reduction of ectopic beats for ECG recordings.

The Database

Presentation Of The Database

Since 1975, laboratories at Beth Israel Hospital in Boston and MIT have produced an MIT / BIH database, which began to be distributed in 1980. This database contains 48 records extracted from a half-hour of ECG two-way ambulatory recordings, obtained from 47 subjects studied by the BIH arrhythmia laboratory between 1975 and 1979. 23 recordings were randomly selected from a set of 4000 24-hour ambulatory ECG recordings gathered

from a mixed population of patients inpatients (60%) and outpatients (40%) at Beth Israel Hospital in Boston, the remaining 25 registrations were selected from the recordings which, in consideration of rarely observed arrhythmias, have clinical significance.

Description Of The Database

In order to build a database, we used the MIT-BIH database as a raw database, and the Queen's Signal Processing and Imaging (LTSI) database, which is characterized by the Tompkins algorithm (algorithm for the detection of the different waves of the ECG signal).

Knowing that our database is annotated, we designed a matrix that contains several beats from well-chosen records in order to have the maximum example for each class (Table 1).

Recorders	Number of beats 'N'	Number of beats 'V'	Number of beats 'A'	Number of beats 'J'
200	100	100	0	0
234	100	0	0	50
114	0	0	10	0
232	0	0	100	0

Tableau 1: some records from the database.

Paramètres	Definition
RRp	Since the R pic precede the pic R present.
RRn	From the R pic present at the pic R next.
QRS	Represents the larger QRS complex.
PP	From S to R.
E	ECG signal energy.

Tableau 2: meaning of the parameters contained in the database.

Analysis Of Input Variables

The characterization of the heartbeat by relevant descriptors is essential when designing and implementing any model for recognition of a cardiac anomaly. It should be noted that many approaches cited in the literature have focused on the difficulty of measuring and choosing the relevant ECG signal parameters and their classification. We can mention the work done by several researchers, for the reduction of the QRS complex for each heartbeat. Acharya et al. (Acharya 2004) used spectral entropy, standard deviations, and Lyapunov exponent measurement of rhythmic variation for the neuronal classification of cardiac arrhythmias. Zhou (Zhou, 2003) applied the PCA method to reduce the size of the QRS complex. The reduced vector is then presented at the entrance of a neural network, for the detection of the premature ventricular beat. Lagerholm and Person characterized each cardiac cycle by its RR interval and the coefficients resulting from the QRS complex decomposition into basic Hermite functions. These parameters were used to separate the arrhythmias available in the MIT-BIH database, using a Kohonen map. Krishna and Sohambi (Krishna 2003) used a multilayer perceptron to identify ectopic beats, with an input vector composed of wavelet coefficients and the RR rhythm. Minami et al (Minami 1999) calculated the spectrum of each QRS complex for the recognition of ventricular tachycardias via a multilayer neuron network. Fredric and Soowhan (Fredric 1996) calculated two coefficients by the linear prediction method at each QRS complex for the classification of VEBs. Nichola et al. (Nicholas 2004) segmented the ECG signal into a set characteristic values, using the Markov model, lately in the works of Chikh, (Chikh 2003). As we have already pointed out at the beginning of this chapter, the right choice of parameters of the input vector to the classifier is very important. For that we proceed to a geometrical analysis of the data (two-dimensional, three-dimensional) to see the degree of belonging of each parameter with respect to the different targeted classes (Normal, Ventricular, Auricular and Junctional).

Classification

HMMs are very promising alternatives to circumvent some of the limitations of conventional computers. Through their parallel processing of information and their mathematical underpinnings, they infer emerging properties to solve complex problems. Our HMM methodology helps the practitioner to make a decision.

Methodology Of An Hmm

A HMM is described by several stages for its design: evaluation, decoding and learning.

Evaluation

The evaluation lies in the calculation of the probability of the sequences of observations in an HMM $P(O/\lambda)$. We used the Forward algorithm for the evaluation of transitions and emission matrices as well as the initial vector that are specific to each model of the HMM, in fact we created four models for the four classes associated with the four pathologies (normal, Ventricular, Auricular and Junctional).

Evaluation Algorithm

$$P(O/S, \lambda) = \prod_{t=1}^T P(O_t / S_t, \lambda) = \prod_{t=1}^T b_{S_t}(O_t)$$

S is however not known in practice, but we have probabilities:

$$P(S/\lambda) = P(s_1) \prod_{t=2}^T P(s_t / S_{t-1}, \lambda) = \pi_{s_1} \prod_{t=2}^T a_{S_{t-1}, S_t}$$

According to the probabilities we have:

$$P(O, S/\lambda) = P(O / S, \lambda) P(S / \lambda) = \pi_{s_1} b(O_1) \prod_{t=2}^T a_{S_{t-1}, S_t}(O_t)$$

Resolution of $P(O/\lambda)$ summing on all possible S:

$$P(O/\lambda) = \sum_{S} P(O, S/\lambda)$$

Learning

In order to maximize the probability of generating an observation sequence from the training data, we used the Forward Backward algorithm to adjust the parameters of the four HMM models (cited above). the probability of observing the partial sequence from the beginning to the time t, $\{O_1, \dots, O_t\}$

$$\alpha_t(i) \equiv P(\{o_1, \dots, o_t\}, s_t = S_i/\lambda)$$

So the Baum-Welch algorithm consists in assembling the two procedures (before and after), by calculating the probabilities $\gamma_t(i)$ and $\xi_t(i, j)$: $\gamma_t(i)$: which is the probability in the state S_i at time t knowing the observation sequence O and the model λ .

$\alpha_t(i)$: explains the sequence of time t in the state S_i until time T.

$\beta_t(i)$: explains the sequence from the beginning to the time t in the state S_i .

$\alpha_t(i)$ and $\beta_t(i)$: explains the sequence has the effect that at time t, the system is in state S_i .

$\xi_t(i, j)$: probability of being in the state S_i at time t and in state S_j at time t + 1 being gives the sequence of observations O and the model λ .

$$\begin{aligned} \xi_t(i, j) &\equiv P(S_t = S_i, S_{t+1} = S_j / O, \lambda) \\ &= \frac{\alpha_t(i) \partial_{i,j} b_j(o_{t+1}) \beta_{t+1}(j)}{\sum_k \sum_i \alpha_t(k) \partial_{k,1} b_1(o_{t+1}) \beta_{t+1}(i)} \end{aligned}$$

$$\xi_t(i, j) = \frac{\alpha_t(i) \partial_{i,j} b_j(o_{t+1}) \beta_{t+1}(j)}{\sum_k \sum_i \alpha_t(k) \partial_{k,i} b_i(o_{t+1}) \beta_{t+1}(i)}$$

Experimental Results

The results presented in this study, for the classification of ECG signals were obtained by applying to the input of each classifier ECG signals of "LTSI". This work was conceived by first using the Matlab for the

implementation of the multilayer perceptron, then the JAVA programming language to test our technique (hidden Markov chains), we used our own database (Table 1), extracted from the LTSI database to implement the evaluation algorithms Viterbi and Baum-Welch. Our classification system allowed us to obtain a recognition rate of 90% for the multilayer perceptron and a recognition rate of 92.20% for the Markov chains by applying all the ECG recordings of LTSI presented in our study. , with the details concerning the classification rate of each class of which we obtained a rate of 88% for the Normal class, 99% for the Extrasystole Ventricular class, 98% for the Extrasystole Auricular class and 97% for the Extrasystole Junctional class.

Conclusion

Hidden Markov chains have a major advantage in classification compared to other classifiers because of their speed of execution and ease of interpretation. Note that in the medical field, any expert requires any automatic method of diagnosis to justify its decisions, a feature absent in several techniques cited in the literature especially neural networks. The method we present in this article provides physicians with precision and minimal computation time. The quality of the ECG signal represents a major constraint for the recognition of different pathologies. As well as the mode of acquisition has a major role to differentiate between ventricular extrasystole and other pathologies. Our database extracted from the MIT-BIH and LTSI database is essentially composed of DII derivation beats which constitutes a major handicap during the classification. We have successfully implemented a classifier based on hidden Markov chains. The results obtained are very encouraging, 92% is a performance that can be improved if we increase the number of derivations.

References

- Who. (2010). *World Health Organization*, Library Cataloguing-in-Publication Data.
- Acharya R.U. (2004). Classification of cardiac anomalies using heart spleen signals, *Med. Bio. Eng. Comp*, Vol. 42 (pp.288-293).
- Chikh M.A. & Belgacem, N. & Meghnefi, F. & and Bereksieguig (2003) , Identification of PVC Beats by *Neural Nets, Sciences & Technologies B*, n0.20 (pp. 28- 32).
- Zhou J.(2003). Automatic Determining of Premature Ventricular Contraction Using Quantum Neural Networks, *Proc of the 3rd IEEE Symposium on BioInformatics and bioEngineering BIBE'03*, (pp. 169- 173).
- Fredric, M. & Soowhan H. (1996). Classification of Cardiac Arrhythmias using Fuzzy ARTMAP, *IEEE Trans. Biomed. Eng.*, vol. 43, no 4.
- Minami K. & Nakajima H. & Mark, R. & and Toyoshima, T. (1996). Realtime discrimination of ventricular tachyarrhythmia with fourier-transform neural network, *IEEE Trans. Biomed. Eng.*, vol. 46, no 2.
- Krishna G.P. & Sahambi J.S. (2003). Classification of ECG Arrhythmias using Multi-Resolution Analysis and Neural Networks, *Convergent technologies for the asia- pacific region*, (pp.227-231).
- Quiniou R. & Cordier M.O. & Fromont E. & Portet F. (2006). Apprentissage multisource par programmation logique inductive, *15e congrès francophone AFRIF-AFIA Reconnaissance des Formes et Intelligence Artificielle*, France.
- Hendel M. & Benyettou A. & Khelil H.(2009). Classification des arythmies cardiaques par les cartes topologiques de kohonen . *Congrès sur le Traitement et Analyse de l'information : Méthodes et Applications*, Tunisie.
- Messaoud A. & Benmessaoud M. & Kachouri A. & Sellami F.(2005). Classification des arythmies cardiaques par logique Floue à partir de signaux ECG . *SETIT*.
- Benali R. & Chikh M.A.(2009). Reconnaissance des extrasystoles ventriculaires par la combinaison des réseaux de neurones et la logique floue. *Conférence CIIA*, Algerie.
- Yeh Y.C. & Wang W.J. & Chiou C.W.(2009). Heartbeat Case Determination Using Fuzzy Logic Method on ECG Signals. *International Journal of Fuzzy Systems*, Vol. 11, No. 4.
- Mateo J. & Torres A. & Rieta J.J. (2011). An Efficient Method for Ectopic Beats Cancellation Based on Radial Basis Function. *33rd Annual International Conference of the IEEE EMBS Boston*, Massachusetts USA, 2011

Leonardo's Scientific Method: The Take Home Message For Science Education

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Abstract

In science education, the study of Leonardo da Vinci's work constitutes a valuable resource not only in terms of contents and potential in interesting, motivating and engaging students, but also in terms of teaching approaches capable to facilitate learners to perceive the character of necessity of subjects, to conceive science not as a collection of finished and polished products and to emphasize the reasons why concepts, methods and theories are formulated.

The main interest of Leonardo was the physical reality, not its simplified modellization, and therefore the starting point of his approach to knowledge, i.e. of his scientific method, was the experience, to which it ascribed a universal value. He wrote: "la Sapienza e' figliola dell'esperienza" (i.e. knowledge is the child of experience) and "ogni nostra cognizione principia dai sensi, onde bisogna limitare la ragione alla isperienza" (i.e. all our knowledge starts from senses and, hence, one has to limit the reason to experience). Furthermore, Leonardo was against those who believed that sciences "principiano e finiscono nella mente" (i.e. begin and end in the mind), namely those who did not believe in direct observation.

The present contribution deals with a critical view of the Leonardo's scientific method and aims to put into evidence its character of modernity and its usefulness in science education.

Introduction

In the late 1950s the British scientist Charles Percy Snow (Snow, 1959, p. 3.) claimed about the chasm dividing the humanists and scientists, whereas about five hundred years ago in Italy many intellectuals developed expertise in different fields giving rise to the expression "Renaissance man" entered in the vocabulary to describe the underlying interdisciplinary spirit (Whiting, 1992).

Leonardo da Vinci interpreted this spirit in a paradigmatic way, thanks to his multifaceted genius and his innovative approach to knowledge which transcended the unity of science and art and prefigured the methodology of modern empirical science. For these reasons Leonardo can be considered as the first modern scientist and a precursor of Galileo, Newton, and Einstein, just to cite some of the "science fathers".

Differently from other scholars who, following the way of modellization, moved themselves, with a given extent, away from reality, the Leonardo's approach to knowledge made him persistently focused on the phenomenological world which he represented through detailed drawings almost always accompanied by descriptions and remarks (Pedretti, 2003; Capra, 2013; Kemp, 2006). More in details, when possible, Leonardo approached the investigated phenomena through accurate observations and both qualitative and quantitative analyses. In the case of simple machines, for example, such as pulleys and winches, and even in the complex case of friction force, Leonardo quantitatively evaluated the value of the forces and the mutual relations between the physical quantities related to the specific observed phenomenon. In such cases, he used operational definitions for these physical quantities and was able to design and foresee the system physical behaviour. In more complex cases, when it was not possible to approach the problem in mathematical terms, he made recourse to extremely detailed graphical descriptions in order to not give up to the real description of the phenomena. In these cases, he replaced the concept of "operational definition" with the "operational representation" - almost a snapshot - of the processes. In other words, especially when it was not possible to get a satisfying description of reality through quantitative methods he used art, that is "art for science" (Pedretti, 2003, p. 79); Capra 2013; Kemp, 2006). With the expression "sol fallano i nostri giudizi" (i.e. only fail our judgments), Leonardo represented the difficulty - and the fallacy that ensues - of pushing beyond experience, "promettendosi di quella effetti tali che ne' nostri esperimenti causati non sono" (i.e. promising effects that in the experiments are not caused), highlighting how effects that in the experiments are not caused may result by wrongly formulated hypotheses.

This approach made Leonardo a precursor of many disciplines, making him a modern scientist and his work valid

in science education as attention getter and critical thinking stimulant. Moving from sector studies showing that students better learn scientific concepts, e.g. in physics, when they make direct experience (Redish, Saul, Steinberg, 1998, p. 212; Redfors, Ryder, 2001, p. 1283), this contribution aims to highlight the specific aspects of the Leonardo's scientific method through concrete examples of his punctilious interdisciplinary work and his often counterintuitive results.

The Scientific Method Or The “Scientific Methods”?

The modern age is characterized by the figure of Galileo Galilei with his scientific method and his nature laws formulation. The approach of Galileo was essentially based on “difalcare gli impedimenti”, i.e. neglecting impeachments through a low empiric vision of the experiment in which phenomena are at first idealized in an approximate way, by removing the complexities appearing as no determinant, and then explained in abstract terms and where the facts had the role of a check for the formulated hypothesis (Jardine, 1976, p. 277; Lovell Wisan, 1978; Koertge, 1977, p. 389; Drake, 1975; Gilbert, 1960). To report a specific case, one of the most important assumptions of Galileo was limiting the observation to relatively heavy bodies and, in turn, neglecting friction forces. An updated version of his method is sketched in figure 1 where it is shown how, starting from the observed phenomenological world, one selects the system relevant empiric referents through operative definitions of the involved significant physics quantities and tries to determine the relations existing among these measurable quantities, i.e. the empirical laws, these latter constituting the so called “primary model”; at this stage, at a higher epistemological level, explicative conjectures, constituting the so called “secondary model”, are introduced through the formulation of hypotheses; these conjectures are then tested and, depending on the test findings, they can be refined, modified or confuted.

The Galileo's method, especially through the modellization procedure connected with the selection of a limited and controlled number of significant physical quantities and through the use of operative definitions, generated an authentic epistemological revolution which gave an extraordinary impulse to the physics development. The consequences were noticeable and brought to a more and more extended mathematization of physics.

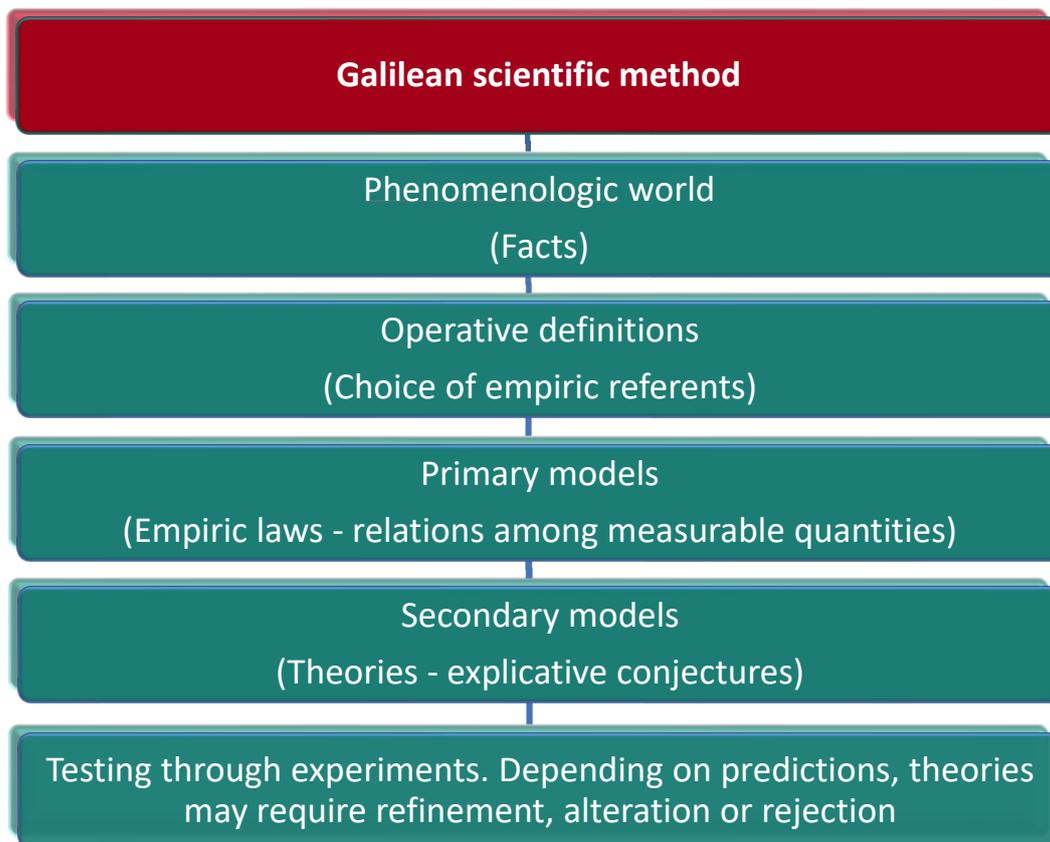


Figure 1 Scientific method approach attributed to Galileo.

However, due to successive science developments, this method did not appear always adequate in those contexts which required a broader vision of reality and nature (Redfors, Holgersson, 2006; Naylor, 1976, p. 398). More in details, generally speaking, at least three “revolutions” can be distinguished (Suppe, 1977):

- The «first revolution», known as Galilean-Newtonian reductionist model, led to an ever higher degree of predictability of phenomena and was based on the belief that world is a mosaic of parts that can be studied independently from the environment; it dominated until the XXth century.
- The «second revolution», that of Einstein’s relativity and quantum mechanics, showed the groundlessness of the determinism.
- The «third revolution», started in the second half of the XXth century, saw a research focused on irregular and unrepeatable processes where the reductionist conception is overcome in favor of a global point of view which takes into account complex systems.

As far as the present status of science education is concerned it should be stressed that educators and researchers have substituted the concept of a unique “scientific method” with that of “scientific methods”, depending on the specific discipline, topic and case to be taken into account (Feibleman, 1991, p.83).

A highly appreciated and all encompassing version of scientific method is the so called “5W journalistic-like” method (https://en.wikipedia.org/wiki/Five_Ws) shown in Fig. 2.

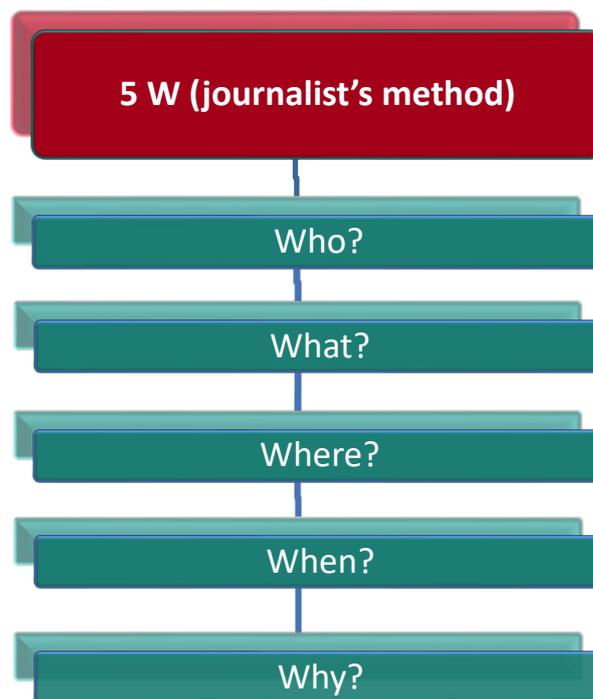


Figure 2 The so called 5W journalistic-like scientific method.

Following this approach (which could be further reduced to the sentence “How and Why?”), it is at first essential to define the investigated system (corresponding to the 1st W, Who?) with its description and configuration variables. Then, the primary model with its phenomenological laws (corresponding to What?) and its context variables (Where and When?) are introduced. Finally, with the 5th W, corresponding to Why? an explication, which requires the formulation of a secondary model, is furnished.

The Leonardo’s Scientific Method

In the last few years physicists, mathematicians, engineers, anatomists, botanists have undertaken examinations of Leonardo’s work in science and technology, agreeing on the fact that Leonardo can be considered as the first modern scientist (Galili, 2016, p. 115).

The observational skills of modern science were introduced in the Renaissance when there was a rediscovery of the classical antiquity notion that man was the measure of all things (Sholarin, Wogu, Omole, Agoha, 2015, p.178). The fervent environment of artisans, engineers, architects, navies, traders, making use of measurement and calculations, met above all in the “Verrocchio’s bottega”, led Leonardo to recognize the fundamental office of mathematics in the investigation of the physical world and to try to approach mathematics thanks to his friend Luca Pacioli (O’Connor, Robertson, 2015).

It should be taken into account that Greeks had always avoided experimentation and Renaissance humanists uncritically took up the assertions of classical texts: compared to them Leonardo developed a new, more empirical approach to knowledge.

The empirical approach was natural for Leonardo, who was both a scientist and an artist: he considered the eye the most important tool at our disposal for understanding nature and for him painting was science; therefore his

science cannot be understood without his art, and vice versa his art needs science. Leonardo followed his own scientific method to formulate a science for complex systems, such as for example the living forms, taking into account the mutual connection among all phenomena and the interdependence of the parts with the whole.

Leonardo believed that the creativity of Nature was superior to the machines designed by man; for him it was wise to learn from Nature, not to dominate it, as Bacon later said (Bacon, 1870).

This holistic and ecological method makes Leonardo da Vinci a «complexity scholar» that only now, after five centuries, has re-emerged in scientific research and which is called «science of complexity».

If he had published his writings, he would probably have been given the title of «father of modern science» that was instead attributed to Galileo (Galili, 2016, p. 115; Geymonat, 1981; Geymonat, 1977).

The starting point of his scientific method was the experience (Kemp, 2011) to which he ascribed a universal value and he had in great consideration mathematics (Marinoni, 1982).

He wrote:

- i) “The merit of painting lies in the exactness of reproduction. Painting is a science and all sciences are based on mathematics” and
- ii) “No human investigation may claim to be a true science if it has not passed through mathematical demonstrations, and if you say that the sciences that begin and end in the mind exhibit truth, this cannot be allowed, but must be denied for many reasons, above all because such mental discourses do not involve experience, without which nothing can be achieved with certainty”.

This latter sentence approaches Leonardo to Einstein who wrote: “As far as the laws of mathematics refer to reality, they are not certain; and as far as they are certain, they do not refer to reality”.

Experience And Science

The main interest of Leonardo was the physical reality and not its simplified modellization.

It is important to take into account that Leonardo formulated the causality principle: «Nessuno effetto è in natura senza ragione; intendi la ragione e non ti bisogna sperienza» i.e. In Nature no effect exists without a reason; you understand the reason and you do not need any experience.

Furthermore, in his Vitruvian man, the standing man inscribed in the square shows vertical and horizontal signs at the level of the hands, knees, pubis, shoulders and along the whole chest. The square, which in symbolism represents the physical reality, could report the Leonardo’s revisited canon referring to the measurement process necessary for the scientific knowledge. The circle could symbolize the sphere of truth, to which man yearns, and which is eccentric with respect to the physical, imperfect and measurable reality represented by the square. Therefore the human body, besides being the object of painting, becomes a measure system, which for Leonardo is an instrument of knowledge based on the analytical observation of the nature.

In this framework, the starting point of knowledge is experience, the phenomenal reality, which he represents in detailed drawings, sometimes accompanied by incisive captions. To the concept of operative definition of the physical quantities he added an operational (quasi-photographic) representation of the processes.

More specifically, in simple cases, such as pulleys, winches, and friction forces analysis, Leonardo performs both a qualitative and a quantitative analyses, quantitatively evaluating the value of the forces involved and the mutual relations between physical quantities at stake and then, by using operational definitions of the physical quantities themselves, designing and predicting the behavior of machines not yet realized. In complex cases, i.e. when it was not possible to deal them with mathematics, Leonardo does not renounce to a realistic description through representation of the processes themselves by means of very detailed drawings, creating an art for science. For Leonardo drawing was a kind of language in images more immediate than words.

Fundamental Role Of Mathematics

Leonardo was well aware of the prodigious applicability of mathematics to natural and technological world and in different other occasions he stressed the importance of mathematics: «Chi biasima la somma certezza delle matematiche si pasce di confusione, e mai porrà silenzio alle contradizioni delle sofistiche scienze, colle quali s’impara uno eterno gridore and ... O studianti, studiate le matematiche, e non edificate senza fondamenti», i.e. who deplores mathematics certitude eats confusion and never will put into silence the contradictions of sophistic sciences, with whom one learns an eternal crowd and... students, study mathematics and avoid building without fundaments.

And again: “l’uccello è strumento operante per legge matematica”, i.e. the bird is an operative instrument by mathematical law; “nessuna umana investigazione si può dimandare vera scienza, s’essa non passa per le matematiche dimostrazioni e nessuna certezza e dove non si può applicare una delle scienze matematiche”, i.e. “no human investigation can be considered a true science, if one does not pass for mathematical demonstrations and no certainty is where one cannot apply one of the mathematical sciences”.

He thought that mathematics furnishes the most appropriate language for the formulation of the laws of nature, as Pitagora believed important to bring the changing aspects of reality to the unique and invariant principle of numbers and as Plato he believed distorting the separation of abstraction and reality.

The conception of the experimental method by which nature is comprehensible through mathematics approaches Leonardo to Galileo. For mathematicians and physicists the recognition of quantifiable regularities, proportions, symmetries and analogies in nature plays a central role. On the remarkable effectiveness of mathematics in describing the laws of nature Eugene Wigner (Wigner, 1960, p. 1) wrote: “The miracle of the appropriateness of the language of mathematics for the formulation of the laws of physics is a wonderful gift, which we neither understand nor deserve. We would be grateful for it and hope that it will remain valid in future research and that it will extend, for better or for worse, to our pleasure, even though perhaps also to our bafflement, to wide branches of learning.” Wigner reputed “a scandal [...] an enormous gap in human understanding” the failure of science in explaining the universe mathematical nature.

In the following we shall report two examples showing how in the simple case of friction Leonardo determined the phenomenological law and was able to perform predictions, while in the complex case of pendulum he did not renounce to a realistic phenomena description.

Educational Examples Based On The Leonardo Scientific Method

First experiments on friction were carried out by Leonardo da Vinci who illustrated them in drawing mainly recorded in the Codex Atlantico and Codex Arundel, the Leonardo’s first note and sketches relating to friction being probably written in 1493. Leonardo was able to point out that the value of the coefficient of friction depended on the nature of the surfaces and the state of lubrication.

From the experiments dealing with rectangular block sliding over a plane surface in different ways, Leonardo deduced the laws governing the motion of the block; the first quantitative investigations of friction and the formulations of the two fundamental “laws” of friction, later formally enunciated by Amontons (Amontons, 1699, p. 206), can be attributed to Leonardo, even though the term “tribology” was used for the first time almost half century after the death of Leonardo. Nowadays students still perform similar equipment and they study the classical laws of friction, which can be summed up in four statements:

- i) the frictional force F is directly proportional to the load W ;
- ii) F depends on the nature of the sliding surfaces;
- iii) F is independent of the area of contact between the surfaces;
- iv) F is independent of the sliding velocity;

as enunciated by the three French physicists Amontons, Coulomb and Morin (Amontons, 1699, p. 206; Coulomb, 1785, p. 163; Morin, 1833, p.1); however, the Leonardo’s work has no influence because his notebooks were not reproduced and published until after other investigators had carried out and reported such experiments independently.

If the Leonardo’s friction experiment were used today for physics students, they will find clear confirmations about intuitive concepts, as “rough and hard with rough and hard – movement of the greatest difficulty; rough and soft with rough and soft – medium difficulty”, and also counterintuitive experiments, as that discussed in Madrid I (Madrid I 173 v.c. 1493–7), where Leonardo putted a series of blocks using two different orientation, as shown in Figure 3, demonstrating that friction is independent on contact area.

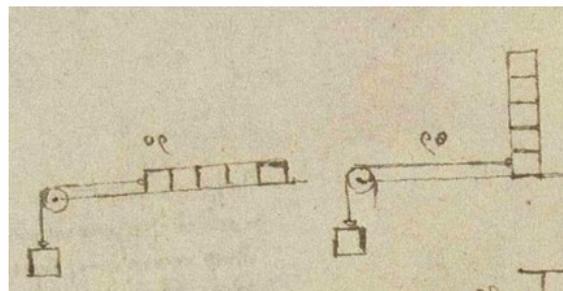


Figure 3 Leonardo’s sketch showing a series of blocks in two orientations

Students show often astonishment on this counterintuitive behavior, since they suppose that friction is higher in the case of blocks putted in series in the horizontal way than in vertical way. In order to provide to them an explanation, with reference to Figure 3 it is possible to observe that:

- pressure is expressed by $P=R/S$, where S corresponds to the “apparent contact area”
- at the “true contact area” T pressure is higher than P , due to the smaller contact areas
- the number of the welding areas generated by T is proportional to S
- the extension of the single contact areas is proportional to pressure P and hence the “effective contact total surface” $E=S*T$ depends only on R .

The pendulum studies play a crucial role in the development of science, as exemplified by conservation laws, collision laws, gravity acceleration g , earth shape and Newton's terrestrial and celestial mechanics. The historian Richard Westfall remarked that "without the pendulum, there would be no Principia" (Westfall, 1990, p. 59).

The pendulum role in physics education is also fundamental, since pendulum is one of the most discussed topic in both theoretical and experimental physics courses. In Fig. 4 the Leonardo's sketch describing natural oscillations of a pendulum is reproduced, pointing out an apparent contradiction with real pendulum, due to the distinction of Leonardo between "natural motion" and accidental motion": "L'impulso trasporta l'oggetto che si muove al di là della sua posizione naturale. Ogni movimento ha una lunghezza definita secondo la potenza che lo muove, e basati su questo per stabilire la tua regola. Ogni oggetto che si muove che acquisisce della velocità nell'atto di muoversi, è mosso dal suo movimento naturale, e così, inversamente, quando la perde, si muove di movimento accidentale." (Forster II 141 v.). Such approach could be very useful for students, who would learn to study the pendulum motion as "a decaying oscillating bob rather than an isochronal device" (Galili, 2016, p. 115).

In Fig. 4 the dissipation of energy during oscillations is also described by Leonardo, drawing a decreasing arc described by these oscillations: "The smaller the natural motion of a suspended weight, the more the following accidental motion will be equal in length". With this discovery he anticipated the theoretical formulations of Galileo (Naylor, 1974, p. 23) and the practical applications to the development of pendulum clocks by about a century and a half.

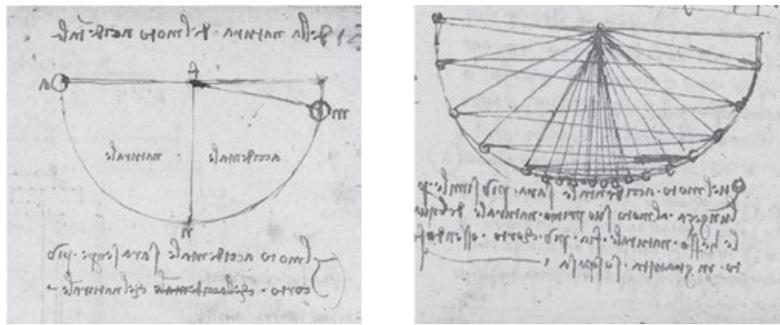


Figure 4 Sketch of natural oscillations.

It should be observed that Galileo was primarily interested in the laws of Nature, highlighting, in spite of its complexity, the regularity of the analyzed events; in the specific case of the bodies fall, or of the inclined plane, the most important adopted shrewdness was that to limit his observation to relatively massive bodies: under such circumstances the fall is independent on the falling body's volume, shape and construction material. In conclusion, in addition to the small-angle simple-pendulum formula commonly exhibited to first-year students, which represents a limit case of a much wider range of real world behavior, a series of educational measurements based on the Leonardo pendulum drawings and experiments extended to large amplitudes and large masses would be a valuable analysis of such milestone for the physics education.

Conclusions

In the early years Leonardo only produced the *De divina proportione*, while during the last part of his life spent in France, invited in 1516 by the king of France Francis I to Amboise located near Tours, he had not enough time to take care of the organization and publication of the scientific contents found in his manuscripts, as it was probably in his intentions. The generous king Francis I, who informed of the Leonardo death rushed to Amboise from Paris, inherited the Mona Lisa, while the Leonardo's manuscripts were assigned to Melzi. Although the corpus of the Leonardo's notes has been spread, by a structured analysis of the Leonardo work addressed to the method for investigating and understanding nature, as the one proposed in this paper, an innovative educational method can be identified: we pointed out that a 500 years old approach to the science can help the 21st century science students.

References

- Amontons, G. (1699). *De la Resistance Causée dans les Machines*, Paris, Memoires de l'Academie Royale.
- Bacon, F. (1870). *The Works of Francis Bacon*, London, Ellis R. L. and Speeding J. eds., Longmans and Co..
- Capra, F. (2013). *Learning from Leonardo – Decoding the Notebooks of a Genius*, Berret-Koehler Publishers Inc., San Francisco, A BK Current Book.
- Coulomb, C. A. (1785). *Théorie des machines simples*, Collection des Mémoires de l'Académie des Sciences de Paris, 10.
- Cross, B. (1991). *Scientific Method Revisited*, Journal of Science Teacher Education, 83.
- Drake, S. (1975), *Galileo's New Science of Motion*, in *Reason, Experiment, and Mysticism in the Scientific Revolution*, edited by Righini Bonelli M. L. and Shea W. R., Science History Publications, New York.

- Durham F. & Purrington R.D eds., *Some Truer Method. Reflections on the Heritage of Newton*, Columbia University Press, New York, 59.
- Feibleman, J. K. (1972). *Scientific method*, Martinus Nijhoff, The Hague, Netherlands, DOI: 10.1007/978-94-010-2758-8
- Galili, I. (2016). *From Comparison Between Scientists to Gaining Cultural Scientific Knowledge Leonardo and Galileo* Sci & Educ 25. DOI 10.1007/s11191-015-9785-3.
- Geymonat, L. (1977). *Storia del pensiero filosofico e scientifico*, II, Garzanti.
- Geymonat L. (1981). *Galileo Galilei*, Edizioni Einaudi.
- Gilbert, N. W. (1960). *Renaissance Concepts of Method*, New York, Columbia Univ. Press.
- Jardine, N. (1976). *Galileo's Road to Truth and the Demonstrative Regress*, *Studies in History and Philosophy of Science* 7
- Kemp, M. (2006). *Leonardo da Vinci – The Marvellous Works of Nature and Man*, Oxford University Press.
- Kemp, M. (2011). *Leonardo da Vinci, experience, experiment and design*, London, Victoria and Albert Museum.
- Koertge, N. (1977). *Galileo and the Accidents*, *Journal of the History of Ideas* 38.
- Lovell, W. (1978). *Galileo's Scientific Method: A Reexamination*, in: Butts R.E., Pitt J.C. (eds) *New Perspectives on Galileo*. The University of Western Ontario Series in Philosophy of Science, 14, Springer, Dordrecht.
- Marinoni A., (1982). *La matematica di Leonardo da Vinci*. Milano: Philips-Arcadia.
- Morin, A. (1833). *New friction experiments carried out at Metz in 1831–1833*, *Proc. French Roy. Acad. Sci.*, 4.
- Naylor R. H. (1974). *Galileo's Simple Pendulum*, *Physics* 16.
- Naylor, R. H. (1976). *Galileo: Real Experiment and Didactic Demonstration*, *Isis* 67.
- O'Connor J. J., Robertson E. F., (2015). *Luca Pacioli*, School of Mathematics and Statistics, University of St Andrews.
- Pedretti, C. (2003). *The critical fortune of Leonardo's drawings, in Leonardo da Vinci master draftsman*. New York: Metropolitan Museum of art.
- Redish, E.F., Saul J.M, Steinberg R.N. (1998). *Student expectations in introductory physics*. *American Journal of Physics* 66, 212.
- Redfors, A., Ryder, J. (2001). *University physics students' use of models in explanations of phenomena involving interaction between metals and electromagnetic radiation*, *International Journal of Science Education* 23, pp. 1283-1302.
- Sholarin M. A., Wogu I. A. P., Omole F., Agoha B. E. (2015). *Man is the Measure of All Things: A Critical Analysis of the Sophist Conception of Man*, *Research on Humanities and Social Sciences*, 5.
- Snow, C. P. (1959). *The Two Cultures*. London: Cambridge University Press. ISBN 0-521-45730-0
- Suppe, F. (1977). *The Structure of Scientific Theories*, 2nd ed., Urbana, University of Illinois Press.
- Westfall R.S. (1990), *Making a World of Precision: Newton and the Construction of a Quantitative Physics*, in Redfors A., Holgersson, I. (2006). *Student teachers explanations of everyday phenomena and use of models in physics*. Paper presented at AERA 87th Annual Meeting.
- Whiting, R. (1992). *Leonardo: a portrait of the Renaissance man*. London: Barrie & Jenkins.
- Wigner E. P. (1960), *The unreasonable effectiveness of mathematics in the natural sciences*. Richard Courant lecture in mathematical sciences delivered at New York University, May 11, 1959. *Communications on Pure and Applied Mathematics*, 13.

Level Of Satisfaction With The Strategy Of Scientific Research In A Faculty Of The National University Of Chimborazo, Ecuador

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Abstract

Scientific research is one of the three substantive functions attributed to the university. Its adequate instrumentation allows the achievement of the objectives of the training processes in Higher Education. **Objective:** to determine the level of satisfaction of the professors involved in the implementation of a scientific research and technological innovation strategy in the Faculty of Education, Humanities and Technologies of the National University of Chimborazo, Ecuador, February 2014-February 2015. **Method:** a quasi-experimental study with a mixed approach. Professors linked to research projects constituted population. The techniques of survey, interview, participatory observation, self-report and focus group were applied to researcher professors. The designed questionnaire was validated using the Delphi method. The individual and group satisfaction were established through the Iadov technique. The data obtained were processed using descriptive statistics. **Results:** the diagnosis showed that 85.30% of the sample did not have scientific publications, although 82.35% had fourth level degree and experience as a graduate and postgraduate tutor. The preparation of a SWOT matrix made possible to design the respective strategy and its subsequent application based on the triangulation of the data obtained in the different technique. **Conclusions:** The reorientation of the research process in that academic environment enabled the increase of the scientific production of the professor staff. The group satisfaction index of the participants was established in the “satisfactory” category.

Key words: *Research strategy, individual and group satisfaction, Higher Education, scientific production, training process.*

Introduction

Throughout the last decades there has been an explosion of scientific and technological knowledge, which manifests itself visibly through the wide range of new products and services. Every day, the most developed countries and the most powerful companies exponentially increase their investment in areas of interest for their research policies (Solís-Ríos, Moreno-Loera, & Figueroa-González, 2012).

The scientific investigation constitutes one of the three substantive functions that are attributed to the contemporary university. This intervenes decisively in the formation and generation of new knowledge in the students, as well as the solution of pressing problems of the socio-economic and natural environment (Mur-Villar, Casanova-González, Iglesias-León, & Cortés-Cortés, 2014; Hamodi, López-Pastor, & López-Pastor, 2015; Gutiérrez-Hernández, Herrera-Córdova, Bernabé, & Hernández-Mosqueda, 2016).

In relation to the above information, the institutional scientific policy in higher education plays an important role in the training process. Being that the scientific productivity of the stakeholders is one of the fundamental indicators of proper implementation (Larran & Andrades, 2015).

Authors such as Moreno, Molina and Chaon (2014) recognize the investigative pedagogical style as one of the ways in which teachers and students interact during the teaching-learning process. It is oriented to the identification and solution of problems typical of the profession from a complex and interdisciplinary view.

According to Abello and Prado (2014), strategies aimed at increasing university scientific activity represents an appropriate form of management in higher educational institutions. The challenge of functioning lies in the

establishment of academic and administrative structures for the development of research projects that have a constructive impact on the formation and development of knowledge, as well as in society.

In response to the positivist criteria of professor Rojas Ochoa (2013), scientific publications are one of the fundamental indicators for measuring the results of research activity at the individual and institutional levels. From a constructivist position, the author defends that the investigation forms part of the pedagogical work of the teacher, in his dialectic search for the development of autonomy in learners.

When referring to research strategies, Correa Iglesias (2011) affirms that these constitute an efficient way of organizing, directing and promoting cognitive processes. This author does not disagree on the legitimacy of this resource for planning scientific policy in higher education institutions. However, it emphasizes and warns that science should be the path to its construction, during which all the variables inherent to this phenomenon in the corresponding educational context should be considered.

From a critical examination of the work "The method" by Edgar Morin, the French sociologist explains that for the construction of research strategies, it is necessary to contemplate the conceptual and etymological differences between the epistemological and the methodological, while considering the complementarity of these elements when constructing science (Correa Iglesias, 2011).

During the development of research strategies, the creation of project teams is crucial, and the composition should consider the integration of new with more experienced staff. The socialization, coexistence, interaction and group study allow to deepen the theoretical body that is the basis of the investigative process which increases efficiency, facilitates identification of adequate methodologies for the resolution of problems and solidifies the integration and development in the scientific community. The adequate management of human resources guarantees the exponential increase of individual and institutional scientific production, as well as the academic success of universities (Gómez & Menares, 2014).

All the above leads to the positioning that strategic planning of the research processes in the 21st century university, constitutes an essential tool for professional training in higher education.

In 2013, the National University of Chimborazo was the object of an evaluation and accreditation process. It yielded a series of shortcomings in the processes inherent to scientific research, which were reflected in indicators of fundamental productivity and planning. For this reason, a research team was given the task of designing a strategy to reverse this situation in the faculty of Education, Humanities and Technologies proposing the following scientific problem:

What level of satisfaction did the teachers involved in the implementation of a strategy enhancing the process of scientific research and technological innovation in the Faculty of Education, Humanities and Technologies in the National University of Chimborazo have in the period of February 2014 to February 2015?

Methods

A study was conducted with a mixed methods approach, of a quasi-experimental nature, with the purpose of determining the level of satisfaction of the teachers involved in the implementation of a scientific research strategy and technological innovation in the Faculty of Education, Humanities and Technology Sciences in the National University of Chimborazo, Ecuador, during the period of February 2014 - February 2015.

The population was made up of 57 professors linked to research projects that were developed in the background study, which was a non-probabilistic sampling of an intentional type. It was carried out based on criteria that allowed for the selection of 34 individuals, who fulfilled the following:

Inclusion criteria:

- Those with tenure or are full-time employees.
- Those who expressed their agreement to participate in the research.

Exclusion criteria:

- Less than one year of experience in teaching in higher education.
- Teachers whose academic distributives did not include hours dedicated for research activities.

The research tasks were organized following the work scheme shown below:

1. Diagnosis of the factors that intervene in the research activity in the context studied.
2. Identification of the specific problems to be solved, in addition to the respective approach of the objectives that were required to be reached to give the corresponding solution.
3. Design and application of a scientific research and technological innovation strategy in the Faculty of Education, Humanities and Technologies, at the National University of Chimborazo, Ecuador.
4. Evaluation of the degree of satisfaction of the teachers involved in the study sample.

The data observed to establish the diagnosis of the existing situation with respect to the phenomenon studied, were collected using the techniques described below:

- Survey: applied to teachers with a workload that includes research who are members of scientific project groups, to clarify the fundamental difficulties and insufficiencies, as well as to corroborate the data of interest collected through the revision of documents.
- Interview: for the institutional managers at the major and faculty level, with the purpose of verifying the institutional interests and their vision about the progress and results of the research and technological innovation process.
- Participatory observation: through visits made to work sessions in the different project groups.
- Self-report: it was applied to research project team directors about the progress of research and to carry out research work to perfect the process through the joint search of possible solutions.
- Triangulation of sources: it was used in the analysis of the data obtained through content analysis, observation, survey, questionnaire, interviews.
- Focus group: it was carried out with the managers of the training process at the faculty level to identify the fundamental problems and the possible ways to solve them.
- The questionnaire used was validated through expert criteria, which was the Torgerson scale model which was used and developed from the Thurstone model to determine limits. This procedure constitutes a modification of the Delphi method proposed by Campistrout and Rizo (2006).

The processing of the values of the limits was done through these formulas:

$$x_{ik} = (t_k - m_i)$$

$$T_K = \frac{1}{n} \sum_{i=1}^n x_{ik}$$

$$m_i = \frac{1}{n \cdot (m - 1)} \sum_{k=1}^{m-1} \sum_{i=1}^n x_{ik} - \frac{1}{m} \sum_{i=1}^{m-1} x_{ik}$$

Significance:

Xik = The probability pik.

Tk = The upper limit of the kth category.

Mi = The i-th indicator.

Pik = Probability that the i-th indicator is in the kth category.

The group of experts who participated in the validation process of the questionnaire, was made up of seven professors with a Ph. D. degree, in the areas of knowledge corresponding to education and pedagogy, with more than 20 years of experience in university teaching and extensive experience in research, expressed through scientific publications and participation in projects. Therefore, based on the above information the coefficient of individual competence obtained ranged between 0.83 and 0.93, which placed all the members in the high-level category.

The established scale was made up of five categories:

- Very suitable (C1)
- Fairly adequate (C2)
- Adequate (C3)
- Not very adequate (C4)
- Inadequate (C5)

The following indicators were evaluated during the validation procedure of the applied questionnaire:

1. Internal consistency of the questionnaire.
2. Correspondence with the research objective.
3. Relevance of the questions.
4. Ability to obtain the data of the variables of interest.
5. Direct relationship with the object and field of study in which it was entered.

The results of the validation process of the instrument yielded the results shown below:

Table 1. Absolute frequency matrix for the evaluation of the instrument

Indicators	Categories					Total
	C1	C2	C3	C4	C5	
1	4	2	1	--	--	7
2	5	1	1	--	--	7
3	3	2	2	--	--	7
4	5	1	1	--	--	7
5	4	1	2	--	--	7

Source: instrument for validation of questionnaire.

Table 2. Matrix of accumulated relative frequencies for the evaluation of the instrument

Indicators	Categories				
	C1	C2	C3	C4	C5
1	0,57	0,86	1,00	1,00	1,00
2	0,71	0,86	1,00	1,00	1,00
3	0,43	0,71	1,00	1,00	1,00
4	0,71	0,86	1,00	1,00	1,00
5	0,57	0,71	1,00	1,00	1,00

Source: instrument for validation of questionnaire.

Table 3. Abscissa value matrix for the instrument of evaluation

Indicators	Categories		Sum	Average	Range
	C1	C2			
1	0,18	1,07	1,25	0,62	-0,06
2	0,57	1,07	1,63	0,82	-0,25
3	-0,18	0,57	0,39	0,19	0,37
4	0,57	1,07	1,63	0,82	-0,25
5	0,18	0,57	0,75	0,37	0,19
Sum	1,31	4,33	5,65	--	--
Limits	0,26	0,87	1,13	0,56	--

Source: instrument for validation of questionnaire.

The analysis of the distribution of the indicators (table 3) allowed them to be framed in the given category. This was done according to the following criteria:

Category 1 (very appropriate) included those indicators with scale values less than or equal to 0.26. Category 2 (quite adequate) includes those greater than 0.26 and less than or equal to 0.87 and Category 3 (adequate) includes those greater than 0.87. So, only indicator 3 was in the category of quite adequate and the rest in the category of very adequate. Once the questionnaire was applied, the respective strategy was designed and applied where the level of satisfaction among the population studied was assessed using the Iadov technique (Fernández de Castro-Fabre & López-Padrón, 2014).

Individual satisfaction was established through the application of the respective instrument adjusted to the characteristics of the context studied. It consisted of nine questions, whose relationship ignores the subject of the research sample. The scale used was established by the author of the technique mentioned in the following way:

1. Clear satisfaction.
2. More satisfied than dissatisfied.
3. Not defined.
4. More dissatisfied than satisfied.
5. Clear dissatisfaction.
6. Inconsistent.

In the same way, this technique allowed the group to obtain a satisfaction index (ISG), which can obtain values that range between +1 and -1.

$$ISG = \frac{A(+1) + B(+0,5) + C(0) + D(-0,5) + E(-1)}{N}$$

Where N is the size of the sample, while A, B, C, D and E represent the number of subjects with a certain category of individual satisfaction, as shown below:

A: with clear satisfaction

B: more satisfied than dissatisfied

C: not defined or contradictory

D: more dissatisfied than satisfied

E: clear dissatisfaction

The ISG can yield values between +1 and -1 and if they are between -1 and -0.5 this indicates dissatisfaction. While between -0.49 and +0.49 would be a contradiction and between 0.5 and 1 is satisfaction.

The researchers considered the principles of the ethics of scientific research, respecting the self-determination of the subjects involved in the study sample, as well as obtaining the necessary authorizations on the part of the authorities of the Faculty of Sciences of Education, Humanity and Technologies of the National University of Chimborazo.

Results

At the time of diagnosis, the Faculty of Education, Humanities and Technologies at the National University of Chimborazo, Ecuador had 57 teachers with assigned research hours. 18 of them were tenured and the rest had a fulltime contract.

40 professors participated in the guiding methodological activity where the instrument was applied with assigned hours for the realization of scientific research processes, within the respective distributive of teaching hours. 34 responded and delivered the questionnaire used. Those who responded consisted of 9 tenured professors and 25 professors with fulltime contracts.

The experience for the realization of any human activity is of the utmost importance and teaching at the university level is not foreign to this principle. The requirement of rigorous research activity for teachers at this level, make them gain the necessary skills to carry out and direct these processes. In the studied sample individuals prevailed who declared to have teaching experience in higher education from between one and five years at 67.65%.

At the time of the diagnosis, 82.35% of the teachers observed had a master's degree or Doctor of Science and the rest were attending degree programs. Elements from an academic point of view, constitute a strength for the teaching-learning process due to the educational level of scientific preparation of the faculty. Paradoxically, many of the teachers surveyed declared that they lacked experience in scientific publication. 85.30% of these did not have a record of articles in indexed scientific journals in recognized databases.

The results obtained during the research process showed a contradiction between bibliometric production levels and the training achieved by most respondents. In this regard, the authors of the research presented consider that the stages of planning, realization, presentation and defense of the results of the investigative processes, constitute moments inherent to the formation at the university level. However, this not guarantee in their entirety the acquisition of competences related to scientific-academic publication, so that graduates can socialize their results in scientific media, recognized in their respective areas of knowledge.

In relation to the study of the variable "thesis tutorial", it was apparent that about half of the teachers in the study participated in this function in pre and / or postgraduate training at some point. In line with what was stated by the authors in the previous paragraph, the respondents do not have publications resulting from this work and declare difficulties in relation to the research experience, an aspect that would merit establishing a strategy in this regard.

97.06% of respondents reported completing at least one formative scientific research with their students. An analytical look at the results achieved in this study reveals a paradox between this data and the low reports of research results published by the teachers who made up the sample. This is a phenomenon that could be related to an insufficient use of the final reports of the completed research.

It is necessary that the studied sample consider that it needs to overcome the problems identified in methodology and scientific writing in terms of scientific research. This is of great importance, since the problems that are identified at this time are closer to being solved.

In the context studied, the key informants presented difficulties for carrying out methodological work in the academic groups, which could have repercussions on the results of the scientific production of the professionals who made up the study sample.

The results of the applied instruments allowed for the identification of insufficiencies in the formation of the individuals that participated in the study, in subjects related to the implementation and conduction of the scientific processes. Among these observed were:

- Preparation of research projects, with an emphasis on the use of the logical framework methodology.
- Establishment of the theoretical methodological foundations that sustain a scientific process.
- Methods and techniques for data collection, analysis and processing.
- Planning and statistical processing of the data resulting from the application of the different instruments.
- Communication of the partial and final research results, through the writing of scientific articles, books, participation in congresses, among others.
- Conformation of the final report of the research process with an adequate use international standard of writing and bibliographic reference.

When analyzing the need and feasibility of establishing a strategy aimed at reorienting the technical direction for the conduction and development of scientific research in that faculty, the entire sample responded affirmatively.

The design and execution of the strategy presented was carried out from the previous position. The analysis of the data obtained from the application of the instruments applied to the sample and key informants provided criteria that allowed discerning weaknesses, opportunities, strengths and threats (WOST), whose aspects are shown below:

Weaknesses: insufficient

- Experience and preparation of faculty teachers to carry out the investigative process with the required rigor.
- Scientific production of the teachers that made up the sample.
- Number of physical spaces to develop the team activities.
- Development and use of science spaces and scientific-professional knowledge management activities (workshops, scientific conferences, congresses, etc.), in which the scientific projections and the results of the research processes are debated, allowing for shared experiences and for contributing to the execution of projects with greater efficiency and effectiveness.
- Implementation of didactic methods, which limits the development of formative research.
- Agility in carrying out procedures to authorize investigative processes.
- Stability of the teaching staff, predominance of hired teachers that hinders the successful completion of some research processes as well as the preparation and training of new researchers. In addition, this contributes to the disintegration of work or research teams.
- Bibliographic availability on research methodology in the library in the context studied.
- Number of interinstitutional agreements with the public and private sector in search of external financing, which allows for the development of investigative processes to solve the identified needs.
- Little accompaniment of students in research projects and teaching teams.

Opportunities:

- Institutional calls for competitive financial funds for the development of research projects.
- Recently vacated buildings in the faculty's teacher buildings that augur more physical space for work in the teaching research groups.
- Postgraduate courses related to the area of scientific research that not only enhance the preparation, but also constitute spurs to perform the different prospective stages of the project.
- Redesign of the curriculum for the different majors of the faculty, which offer a virgin field for research in this context.
- Institutionalization of research as the axis of the students' training process.

Strengths:

- Provision of teachers to work for their self-improvement, to gain experiences and enhance research activity.
- Projection of the institutional policy to strengthen research.
- Reorganization of the research activity in the Faculty.
- Teachers with greater experience in research and willingness to collaborate with the project teams created.
- Teachers linked to training processes such as Doctors of Science in branches of knowledge directly linked to the areas of training inherent to the academic unit under study.

Threats:

- Budget cuts.
- Possibility of evaluative processes external to the majors.
- Difficulties in the research processes with the participation of external entities.
- Diluted waiting processes for merit and opposition competitions that allows occasional teachers who are part of teams of research projects to opt for tenure.

In response to the results of the diagnosis of the research presented, the following strategic objectives were established:

- Implement training programs in scientific research and communication methodology.

- Plan the research activities in the short and medium term, as well as the possible results.
- Develop a plan for the execution of research projects that require low financial and material resources to achieve their objectives.
- Establish advisors and accompaniment to teachers with a research workload.
- Assess the results of the research activities individually, by project teams and at the faculty level.

At the end of the first year of application of the strategy resulting from the study presented, it could be observed that following the planned schedule, the researchers applied the Iadov technique (described in the "Methods" section). This allowed for determining the degree of individual and collective satisfaction of the individuals included in the sample, with respect to the actions carried out as part of the said strategic procedure.

The degree of individual satisfaction was established by placing the answers to questions 1, 5 and 8 of the respective instrument in the logical table of V. A. Iadov.

Table 4. Level of individual satisfaction

Satisfaction of level	Number	%
Clear satisfaction	14	41,18
More satisfied than unsatisfied	14	41,18
Not defined	5	14,70
Contradictory	1	2,94
Total	34	100,00

Source: Satisfaction Survey.

The individual values allowed to calculate the ISG.

$$ISG = \frac{A(+1) + B(+0,5) + C(0) + D(-0,5) + E(-1)}{N}$$

$$ISG = \frac{14(+1) + 14(+0,5) + 6(0) + 0(-0,5) + 0(-1)}{34}$$

$$ISG = \frac{14 + 7}{34} = 0,62$$

The value of the LIS obtained (0.62) established in the range between 0.5 and 1, so it could be concluded that this was established as satisfactory among the population studied with respect to the research strategy carried out in the context studied.

Discussion

Researchers like González-Puerto, Díaz-Díaz, Alvarado-Peruyero and Maceira-Brito (2013), conducted an analysis of the importance of adequate planning for the availability of human resources to achieve significant scientific productivity. This was highlighting the role of effective collaboration between the components of the science and technology system.

The authors of the research titled *proposal of a strategy for the development of the research activity*, suggest that the consolidation of an experienced teaching staff by the institutions of higher education constitutes an important strength in the fulfillment of the substantive functions of the university of the 21st century. (Saavedra, Salas, Barbe & Leyva, 2007). Regarding the amount of experience for the teachers in their study context, the results obtained were similar to those observed in the present investigation.

The professors that formed the study sample showed a curricular formation at the university and masters level according to the subjects that they taught. For this aspect, Saavedra-Roche, Lopez-Salas, Barbe-Agramonte and Leyva-Barcelo (2007), refers to the importance of the teaching staff having a professional formation related to the area of knowledge in which they coordinate their training research activity.

In correspondence with the observed reality, Arnoux, Borsinger, Carlino, Di Stefano, Pereira and Silvestre (2005) states that the processes of training for masters' programs should work on developing the necessary skills for scientific writing. This will allow the graduates to achieve better productive levels, as well as enriching the heritage of human knowledge in their respective areas of knowledge.

Agno (1992) argues that the fairness of a degree or postgraduate board of examiners in their decision, depends largely on the scientific-academic experience in the area that performs as the evaluator. On the other hand, Segredo-Pérez, Reyes-Miranda, Quintana-Galende, Díaz-Lemus, García-Hernández and Díaz-Hernández (2017) establishes the potential of postgraduate programs with respect to the scientific policy of higher education institutions, in terms of training human resources, generating projects and producing articles.

The development of research skills in university students comes from the teachers' activities in the different subjects, which must be based on the use of problem based teaching by involving the use of the scientific method to reach a solution. The teacher must possess sufficient research, methodological and pedagogical skills to achieve developed and pertinent thinking students (Blanco-Balbeito, Roque-Herrera, Betancourt-Roque, & Ugarte-Martínez, 2013). Low scientific production is not exclusive to the academic environment in which the research presented and developed. In this regard, the data offered by Carpio-Pérez, Momplet-Pérez, Plasencia-Iglesias, San Gabino-Paredes, Canto-Darias and Pérez-Castillo (2016) show a similar situation, considering these indicators: "publications", "participation in scientific-academic events" and "projects registered in science and technology plans". The recognition of the individual and collective weaknesses related to the investigative skills on the part of the sample under study, constituted an important starting point within the designed strategy. Rubio (2014) states that the improvement of scientific-academic activity should be based on the Socratic principle, that the fact of being aware of our own ignorance before the universe of possible knowledge, makes us eternal seekers of the truth. In relation to the difficulties of the methodological work of the teaching collectives, Carpio Pérez et al. (2016) indicated that this activity should be conceived to strengthen the formative and research processes in higher education. During the implementation of a doctoral training strategy at a medical university, researchers Pérez-Díaz, Véliz and Lorenzo-Rodríguez (2015) determined that the completion of a WOST matrix is a feasible and reliable methodological tool to establish an accurate diagnosis with a view on institutional strategic planning. Researchers such as Salas Perea (2000) recognize that the quality of compliance with the substantive functions of the university is related to the strategic planning of the processes linked to these actions which must be contextualized to each academic reality (Abello-Llanos & Pardo-Sánchez, 2014). Sepúlveda-Alzate and Fernández-Morales (2017) establish that one of the ways to measure the effectiveness of academic strategies in higher education is the determination of the level of satisfaction of the beneficiaries. These authors applied the Iadov technique in their training environment for this purpose and obtained results consistent with what had been conceived in the research process.

Conclusions

- The triangulation of the data obtained through the different techniques used allowed for establishing the elements that formed the WOST matrix. This served as a starting point for the design of the research strategy and the execution of technological innovation.
- The reorientation of the research process in the academic environment enabled the increase for scientific production of the teaching staff. The teachers involved in the investigation considered the actions carried out as a need to reverse the diagnosed situation.
- The application of the Iadov technique allowed to establish a group satisfaction index from the members of the sample under study in the "satisfactory" category.

References

- Abello-Llanos, R., & Pardo-Sánchez, K. (2014). Modelos de investigación y desarrollo en instituciones de educación superior en Colombia: el caso de la universidad del norte en la región Caribe de Colombia. *Investigación y desarrollo* [On-line], 22(2), 187-211. Retrieved November 21, 2017, from http://www.scielo.org.co/scielo.php?script=sci_arttext&pid=S0121-32612014000200002&lng=en&nrm=iso.
- Agno, R. M. (1992). El drama de la evaluación, Experiencia Investigativa en una Facultad con Taller de Educadores. *Revista Estudios Sociales* [On-line], (3), 157-165. Retrieved December 11, 2017, de <http://bibliotecavirtual.unl.edu.ar/ojs/index.php/EstudiosSociales/article/download/2280/3300>.
- Arnoux, E., Borsinger, A., Carlino, P., Di Stefano, M., Pereira, C., & Silvestre, A. (2005). La intervención pedagógica en el proceso de escritura de tesis de posgrado. *Revista de la Maestría en Salud Pública* [On-line], (6), 157-165. Retrieved January 5, 2018, from <http://msp.rec.uba.ar/revista/docs/006escrituratesis.pdf>.
- Blanco-Balbeito, N., Roque-Herrera, Y., Betancourt-Roque, Y., & Ugarte-Martínez, Y. (2013). Principales dificultades en los proyectos investigativos en residentes de las especialidades médicas. *Edumecentro* [On-line], 4(1), 7. Retrieved October 12, 2017, from <http://www.revedumecentro.sld.cu/index.php/edumc/article/view/153>.
- Campistrous, L., & Rizo, C. (2006). Indicadores e investigación educativa. En, *Metodología de la Investigación Educativa, desafíos y polémicas actuales.* (pp. 150-164). La Habana: Ecimed.
- Carpio-Pérez, L., Momplet-Pérez, V., Plasencia-Iglesias, M., San Gabino-Paredes, Y., Canto-Darias, M., & Pérez-Castillo, O. (2016). Estrategia metodológica para incrementar las investigaciones sobre Medicina Natural y

- Tradicional en Villa Clara. *Edumecentro* [On-line], 8(1), 31-45. Retrieved December 16, 2017, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2077-28742016000500004&lng=es&nrm=iso.
- Correa-Iglesias, A. (2011). Estrategias de investigación: emplazamientos epistémicos-metodológicos. Retos y posibilidades [On-line]. Retrieved November 13, 2017, from <http://www.pensamientocomplejo.com.ar/docs/files/Correa%20Iglesias,%20Antonio%20-%20Estrategias%20de%20investigaci%F3n%20emplazamientos%20epist%E9micos-metodol%F3gicos.pdf>.
- Fernández-de Castro-Fabre, A., & López-Padrón, A. (2014). Validación mediante criterio de usuarios del sistema de indicadores para prever, diseñar y medir el impacto en los proyectos de investigación del sector agropecuario. *Revista Ciencias Técnicas Agropecuarias* [On-line], 23(3), 77-82. Retrieved October 21, 2017, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S2071-00542014000300012&lng=es&tlng=es.
- Gómez-Francisco, T., & Menares-Ossandón, Néstor. (2014). Los aportes de paradigmas complejos y constructivistas para la enseñanza de la ciencia jurídica. *Ius et Praxis* [On-line], 20(1), 199-220. DOI: <https://dx.doi.org/10.4067/S0718-00122014000100008>.
- González-Puerto, Y., Díaz-Díaz, J., Alvarado-Peruero, J. & Maceira-Brito, J. La producción científica: un reto en Enfermería. (2013). *Revista Cubana de Enfermería* [On-line], 29(1). Retrieved January 9, 2018, from <http://revenfermeria.sld.cu/index.php/enf/article/view/102/43>.
- Gutiérrez-Hernández, A., Herrera-Córdova, L., Bernabé, M., & Hernández-Mosqueda, J. (2016). Problemas de contexto: un camino al cambio educativo. *Ra Ximhai* [On-line], 12(6), 227-239. Retrieved February 12, 2018, from <http://www.redalyc.org/html/461/46148194015/>.
- Hamodi, C., López-Pastor, V. M., & López-Pastor, A. T. (2015). Medios, técnicas e instrumentos de evaluación formativa y compartida del aprendizaje en educación superior. *Perfiles Educativos* [On-line], 37(147), 146-161. Retrieved February 12, 2018, from http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S0185-26982015000100009&lng=es&tlng=pt.
- Larran-Jorge, M., & Andrades-Pena, F. J. (2015). Analysis of social responsibility of universities from different theoretical stances. *Revista Iberoamericana de Educación Superior* [On-line], 6(15), 91-107. Retrieved October 27, 2017, from http://www.scielo.org.mx/scielo.php?script=sci_arttext&pid=S2007-28722015000100005&lng=es&nrm=iso.
- Moreno, CP., Molina, Y. A., & Chacon, JA. (2014). Impacto del estilo pedagógico integrador en los estudiantes de Licenciatura en Educación Básica de la Facultad de Estudios a Distancia. *Formación Universitaria* [On-line], 7(6), 37-44. Retrieved November 19, 2017, from http://www.scielo.cl/scielo.php?script=sci_arttext&pid=S0718-50062014000600005&lng=es&nrm=iso.
- Mur-Villar, N., Casanova-González, M., Iglesias-León, M., & Cortés-Cortés, M. La política científica en la formación de profesionales en las ciencias médicas. Una mirada reflexiva. *Medisur* [On-line], 8(1), 8. Retrieved October 28, 2017, from <http://www.medisur.sld.cu/index.php/medisur/article/view/2758/1431>.
- Pérez-Díaz, N., Véliz, J. Á., & Lorenzo-Rodríguez, Y. (2015). Estrategia de formación de doctores en la Universidad Médica de Pinar del Río. *Revista de Ciencias Médicas* [On-line], 19(1), 100-112. Retrieved October 24, 2017, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1561-31942015000100013&lng=es&nrm=iso.
- Rojas-Ochoa, F. (2013). En defensa de una medicina natural y tradicional avalada por la ciencia. *Revista Cubana de Salud Pública* [On-line], 39(4), 3. Retrieved November 11, 2017, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-34662013000400001&lng=es.
- Rubio, G. (2014). La crítica de Rancière a la educación moderna: notas para una discusión sobre las tramas de la pedagogía. *Polis* [On-line], 13(37), 203-217. DOI: <https://dx.doi.org/10.4067/S0718-65682014000100012>.
- Saavedra-Roche, R., Lopez-Salas, D., Barbe-Agramonte, A. & Leyva-Barcelo, L. A. (2007). Propuesta de estrategia para el desarrollo de la actividad investigativa. *Revista de Humanidades Médicas* [On-line], 7(1), 1. Retrieved December 15, 2017, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S1727-81202007000100008&lng=es&nrm=iso.
- Salas-Perea, R. S. (2000). La calidad en el desarrollo profesional: avances y desafíos. *Educación Médica Superior* [On-line], 14(2), 136-147. Retrieved September 27, 2017, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412000000200003&lng=es&nrm=iso.
- Segredo-Pérez, A. M., Reyes-Miranda, D., Quintana-Galende, M. L., Díaz-Lemus, M., García-Hernández, I., & Díaz-Hernández, L. (2017). The development of research skills in the field of public health. *Educación Médica Superior* [On-line], 31(1) Retrieved February 12, 2018, from http://scielo.sld.cu/scielo.php?script=sci_arttext&pid=S0864-21412017000100005&lng=es&tlng=en.
- Sepúlveda-Alzate, J. H., & Fernández-Morales, M. C. (2017). Modelo de estrategia pedagógica para el desempeño profesional pedagógico de docentes universitarios de lengua inglesa. *Entramado* [On-line], 13(1), 148-170. Retrieved January 11, 2018, from <https://dialnet.unirioja.es/descarga/articulo/6084937.pdf>.

Solís-Ríos, R., Moreno-Loera, H., & Figueroa-González, E. G. (2012). La promoción de la Investigación en Contaduría y Administración, a través de un Centro de Investigación. *Revista Iberoamericana para la Investigación y el Desarrollo Educativo* [On-line], 9, 1-34. Retrieved October 21, 2017, from <http://ride.org.mx/1-11/index.php/RIDASECUNDARIO/article/download/105/102>.

Lexical Units And Their Reference Level

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Abstract

This paper focuses on an analysis of particular English words that are used in ELT in Slovak primary education (ISCED 1 and 2). A study, conducted in March-May 2018, was aimed at finding out correlations between the reference levels of selected words taught at two proficiency levels (CEFR A1 and A2) in Slovak primary schools and those officially presented in the English dictionary. Several words were judged by Slovak language learners and their judgements were compared with the labels in the dictionary. Course books used in English class are considered compulsory material by many teachers, therefore it is expected that learners' judgements will be affected by the reference levels assigned to the course books. The results achieved in the survey will be presented, discussed and commented on with intent to support the development of teaching materials that will provide learners with words that they are expected to master at their levels.

Introduction

The official edition of the Common European Framework of Reference for Languages: Learning, teaching, assessment (Council of Europe, 2001) was followed by an intense discussion about a new reference framework as some applied linguists considered its scales and particular descriptors due to their wording rather inconsistent. However, the exploitation of the framework as such has proved that it is well-founded, being based on the concepts that enrich communicative approaches. After approximately 20 years of its use its impact is recognizable in many national language curricula not only in Europe, but beyond its borders, for example, in Canada (Piccardo, 2014). The concepts that significantly affected the document entail an action-oriented approach, viewing a language learner/user as a social agent who uses target languages for their needs in real-life situations. The CEFR's action-oriented approach represents a shift from structural syllabi towards syllabi based on needs analysis, focusing on language learners and development of their abilities to be efficient in using the language in real-life tasks, and constructed around purposefully selected notions and functions. A learner-centered approach prevails over a traditional approach that emphasizes a teacher and his/her roles in teaching processes such as viewing him/her as a conductor or an orchestra leader who authoritatively controls learners' behavior in the target language. A learner-centered approach views the teacher as a co-partner of learners in their learning process, giving learners an opportunity to work on negotiating meaning. Both the CEFR descriptive scheme and the action-oriented approach put the co-construction of meaning at the center of the learning process.

The CEFR presents communicative language competence as a set of competences such as linguistic, socio-linguistic and pragmatic combined with general competences entailing intercultural, strategic and existential competences. Four modes of communication (reception, production, interaction and mediation) replace a traditional classification of communicative language skills (listening, reading, speaking and writing).

These new concepts have attracted language professionals who either incorporate them into national documentation related to language teaching and testing, or directly try to link their language documentation to the CEFR. Linking is a complex process and is based on validation of the claims that requires rigorous and long-term team work. These national efforts stimulated international printing houses that have launched sets of course books labelled by six or even nine reference levels (A1, A2, B1, B2, C1 and C2, additionally completed by A2+, B1+ and B2+). International testing centers started to design language examinations and tests, labelling them in the same way. This labelling has exceeded its former intention as 6 reference and 3 plus levels, thoroughly described in the framework, completed by illustrative samples were to define particular language competences learners and/or users of target languages need to be aware of from various reasons such as being properly placed in the language course, assessing their own level of proficiency while applying for a new job or being admitted to foreign universities. The reason the CEFR includes so many descriptor scales is to encourage language learners/users to develop differentiated profiles as it reflects real-life situations in which people use target languages for different purposes (North, 2014).

The CEFR has had practical impact on language teaching and testing and has become a valuable resource for researchers, policy makers, test developers and teachers. The process of linking curricula and language examinations has become challenging and inspiring for the countries in the whole of Europe. Extensive research into vocabulary and grammatical patterns has been carried out as part of a collaborative project led by two departments of the University of Cambridge: Cambridge University Press and Cambridge English Language

Assessment, supported by the Council of Europe. This research based on a collection of several hundred thousand examinations scripts written by learners from all over the world, combined with other materials such as course books, etc. resulted in English Profile including two innovative online tools English Vocabulary Profile Online and English Grammar Profile online. These databases give language educators free access to the finding on what English vocabulary and grammar is suitable for teaching and testing at each CEFR level (www.englishprofile.org).

The Study

The Slovak Curricula for English are based on the CEFR and learners, their parents and teachers or any stakeholders are transparently informed about learning outcomes expected at different levels of language education, for example, A1 in the fifth year of primary education, A2 in the ninth year of primary education (ISCED 2), and B1 for secondary technical or vocational schools and B2 for secondary grammar school leavers at the end of secondary education (ISCED 3). An exception to the rule is a group of those students who study at bilingual schools or bilingual sections of secondary schools and are required to achieve C1 (ISCED 3). In our context, English tends to be a foreign language most students choose for completing their foreign language education as more than 80% out of the total number of applicants for final language examinations are students who want to sit for one of the reference levels of external language examinations in English. While in school year 2016/2017, level C1 was chosen by 1,211 students out of 32,026 applicants for English tests, in the 2017/2018 school year, the total number of applicants for English was 36,376 out of which 1,579 students applied for C1 due to their bilingual studies.

Due to its popularity, English has been taught as the first foreign language since 2013/2014 and in most primary schools, young learners can start its learning from the very beginning despite the fact that it is obligatory from the third year of primary education. This tendency required intensive training of other language teachers to become English teachers, and a massive retraining process, launched in 2009, enabled primary school teachers to be retrained and teach English to their own students in the junior cycle of primary school. Apart from language acquisition, their five-year educational program included core subjects of the bachelor and master degree programs originally designed for those students whose major is English at faculties of education.

This shift towards teaching English quite early (since year 1 of primary education) initiated changes in teaching processes and methodologies that are relevant for young learners, for example, TPR, story-telling, drama activities, using nursery rhymes, etc. These alternative methods were emphasized in pre-service and in-service teacher training and required searching for proper teaching materials and experts who were ready to share their teaching experience. The fundamental concepts related to teaching English to young learners provide deeper insights into teaching those who have not mastered their mother tongue properly and recommend the steps necessary for successful acquisition of a target language, for example, listening and speaking precede reading and writing, vocabulary and grammar are presented in chunks, a large number of words are naturally learnt in their proper contexts, etc.

As mentioned before, the CEFR has an intense impact on language education in Slovakia. Course books used for teaching English are mostly those published in the United Kingdom, labelled by the reference levels. It inspired us to find out to what extent vocabulary used in the course books labelled by reference levels and words practiced in English class corresponds with information about which words and their meanings are used by learners at each level of the CEFR presented in the English Vocabulary Profile (EVP). In our study, we assume that words Slovak learners of English learn naturally in primary school do not correlate with reference levels assigned to words in the EVP and will be judged as lower levels of the CEFR than they are labelled in the Cambridge Advanced Learners Dictionary, based on the English Vocabulary Profile (EVP) with the recommendation that this information serves for language learners which words they need to prioritise in their vocabulary learning. The EVP has also been informed by the Cambridge English Corpus, a multi-billion word corpus of spoken and written current English. The research sample contained 30 English words that were taken from the course books used in different years of English learning (Appendix A). Students start learning English in year 3 and in year 9 they have been learning English for 7 years. The words referring to our research were taken randomly. Table 1 shows an overview of the years in which the students learned the selected words from the course books published in the UK and the number of words taken from the research sample for an in-depth analysis.

Year	3	4	5	6	7	8
No of words	5	5	5	5	4	6

Table 1: The year of primary school and the number of words from the sample

The idea of presenting this overview is based on providing a clear picture that the words chosen for our research are not the words that belong to additional vocabulary provided by teachers, but vocabulary that is prescribed by English course books that officially claim to be compatible with the CEFR.

We addressed 28 students (19 females and 9 males) of the 8th and 9th year of primary education from one primary school located in the countryside. The students at their age of 13-15 were given the list of words (Appendix B)

and were asked to judge the CEFR level. Their judgement was supported by remembering them to take into account at which year of education they have learned those words. Years 3-5 are meant to match A1 and years 6-8 are to be linked to A2 as these are the two proficiency levels primary school students are expected to achieve in English. Later, the students were asked to translate the given words as our intention was to obtain evidence about their knowledge of the word.

Findings

The students' judgements of the presented words were based on their personal experience, significantly influenced by the year in which they were exposed to the word most frequently. From the respondents' answers (Appendix A), it is possible to conclude that only several students were not able to judge the given words. The most problematic word seems to be the expression *lettuce*, which students were expected to learn in year 6 when they started to move from reference level A1 towards A2. This word has not been judged by 7 students and it is assigned CEFR level B1 in the Cambridge Advanced Learners' Dictionary (McIntosh, 2013).

In Slovakia, reference level B1 is required to be achieved in either the second year of secondary grammar school education or in the end of vocational education (4 years). Level B2 is an obligatory level for those who decided to study at secondary grammar school and have to sit for an examination of one selected language. The table below shows a distribution of selected words assigned 4 particular CEFR levels by the English Vocabulary Profile and the Cambridge Advanced Learners' Dictionary (McIntosh, 2013).

CEFR levels	A1	A2	B1	B2
No of words	5	10	10	5

Table 2: CEFR levels assigned with selected words

While words such as *lion*, *monkey*, *rabbit* were naturally expected to be judged as words students would not have any problems with, the words such as *frog*, *shark*, *spider* were also decidedly judged as A1 by students who considered them easy and their familiarization with them supported their definite decisions. They could acquire their meanings from fairy-tales or films. Surprisingly, the CEFR level assigned to the latter words was B1. The expression *tiger* (B1 in the CALD) Slovak students learn in year 6 of their primary education was very easy for them as the same word exists in the students' mother tongue. On the other hand, words such as *sore throat*, *bleed* and *prescription* were judged A2 and the learners became familiar with them only in year 7. These words are assigned B1 and are frequently presented in the course books labelled that particular level. Six students did not estimate the word *prescription*.

The word *crocodile* is assigned level B2 according to the CALD (McIntosh, 2014), however, a very similar word in Slovak 'krokodíl' led students to estimate it suitable for level A1. Other B2 words (*spot*, *treatment*, *x-ray* and *infection*) were judged A2 as students could come across them in years 7 and 8. The words are related to the topic of health or medicine, which is usually dealt with later than more general topics such as family, everyday life and situations, shopping, etc.

As far as translation is concerned, it is not important to comment on the words the translation of which was achieved at 75%, which means the passkey for success was 21 correct answers. Only six words were significantly translated wrongly or students decided not to translate them at all. The most difficult word for the students was the word *treatment* (2 correct answers, 1 incorrect, 25 not answered). The word *spot* in the meaning of a small mark or lump on a person's skin was correctly translated by 4 students, while 9 wrong answers were completed by 15 empty answer sheets. Six students were not sure about estimating the word *spot*. While these two words are assigned level B2 according to the EVP and the CALD, two words assigned level B1 make some problems to students as well. The word *bleed* was correctly translated by 9 students, 6 students translated it incorrectly and 13 students left their answers out (Appendix C). The word *prescription* belongs to the words called paronyms (false friends) as they have similar equivalents in Slovak but with different meaning. While *prescription* is translated into Slovak as 'recept', English *recipe* has the same translation 'recept'. So Slovak learners are frequently misled and use one English word *recipe* for both Slovak meanings. 14 students avoided translating the English word *prescription*, while 9 translations were correct and 5 incorrect.

This translation task was very useful as we could see that students had problems with some words and therefore they judged their difficulty by estimating their reference level as A2. However, these words belong to higher proficiency levels according to the English Vocabulary Profile and the Cambridge Advanced Learners' Dictionary (McIntosh, 2013).

Conclusions

Our research was aimed at finding out whether the words that are officially assigned a particular CEFR level in the EVP and the CALD are judged to be at the same levels by Slovak learners of English. It is obvious that learners' judgements were influenced by their English course books and all the chosen words were estimated in the range

between A1 and A2 as all of them were presented in those course books. 15 out of 30 words chosen for this study were assigned higher levels (10 B1 and 5 B2) according to the EVP and the CALD. Despite the fact that words are assigned higher levels, A2 learners had some problems with certain words, for example, the word *lettuce* was not translated by 11 students, which accounts about 39%. There is no any similarity with the Slovak expression ‘šalát’ and the students could not use any cues as the words were presented without context.

Despite the fact that the expression *sore throat* belongs to vocabulary recommended for B1 learners, it is presented to Slovak students in primary schools when they are expected to achieve level A2. This expression seemed to be quite difficult for them and was correctly translated by 19 students (67%). On the other hand, it is necessary to emphasize that students had serious problems only with four words: two words assigned level B1 (bleed and prescription) with 9 correct answers and two words assigned level B2 out of which the word *spot* was translated correctly four times and the word *treatment* only two times. The most surprising word was the English word *injection* used in Hutchinson’s Project 4 in year 8, expected to be used at CEFR level C2 by the EVP, we decided to exclude this expression from our analysis.

The reasons for this research are based on our misgivings whether the words in any language might be assigned reference levels. What we miss in the EVP is the concept that supports the idea of language similarities. Language families play an important role in other language acquisition. If the mother tongue and a target language are from the same language family, for example Romance languages, it seems to be easier for Spanish learners to acquire Italian, mainly from the vocabulary perspective. On the other hand, it is significant to distinguish between passive acquisition of language and an active use of it.

Finally, it is necessary to express our gratitude to those who participated in the word collection that was used in the English Vocabulary Profile. Despite the fact that many words of the English formal lexicon are assigned C levels not taking into account that many Indo-European languages use the same specific words in their native languages and therefore they are not difficult for other speakers of languages than English (e.g. *injection* in English and ‘injekcia’ in Slovak), the English Vocabulary Profile is an invaluable source for curriculum development, course book writers, test developers, and last, but not least, teachers who wish to be guided which word or its individual meaning to use while presenting and practicing new materials at a particular CEFR level.

References

- Council of Europe (2001). *A Common European Framework of Reference for Languages: Learning, Teaching, Assessment*. Cambridge: Cambridge University Press.
- Council of Europe (2017). *A Common European Framework of Reference for Languages: Learning, Teaching, Assessment – Companion Volume with New Descriptors*. Strasbourg: Council of Europe.
- English Profile* [Online]. Available: www.englishprofile.org.
- McIntosh, C. (ed.) (2013). *Cambridge Advanced Learners’ Dictionary*. Cambridge: Cambridge University Press.
- North, B. (2014). *The CEFR in Practice*. Cambridge: Cambridge University Press.
- Piccardo, E. (2014). *From Communicative to Action-oriented: A research pathway*. Canada: Curriculum Services.

Appendix A

The list of course books analyzed for the purposes of this study:

Year 3

Bowen, M. & Hocking, L. (2009). *English World 1. Pupil’s Book*. London: Macmillan.

Bowen, M. & Hocking, L. (2009). *English World 1. Workbook*. London: Macmillan.

Year 4

Bowen, M. & Hocking, L. (2009). *English World 2. Pupil’s Book*. London: Macmillan.

Bowen, M. & Hocking, L. (2009). *English World 2. Workbook*. London: Macmillan.

Year 5

Hutchinson, T. (2008). *Project 1. Student’s Book*. Third edition. Oxford: Oxford University Press.

Hutchinson, T. (2008). *Project 1. Workbook*. Third edition. Oxford: Oxford University Press.

Year 6

Hutchinson, T. (2013). *Project 2. Student’s Book*. Fourth edition. Oxford: Oxford University Press.

Hutchinson, T. (2013). *Project 2. Workbook*. Fourth edition. Oxford: Oxford University Press.

Year 7

Hutchinson, T. (2013). *Project 3. Student’s Book*. Fourth edition. Oxford: Oxford University Press.

Hutchinson, T. (2013). *Project 3*. Workbook. Fourth edition. Oxford: Oxford University Press.

Year 8

Hutchinson, T. (2014). *Project 4*. Student’s Book. Fourth edition. Oxford: Oxford University Press.

Hutchinson, T. (2014). *Project 4*. Workbook. Fourth edition. Oxford: Oxford University Press.

Appendix B

	WORDS	YEARS 3 – 5 (A1)	YEARS 6 – 8 (A2)	NO RESPONSE	YEAR OF STUDY	CALD
1.	apple	28	0	0	Year 3	A1
2.	cat	28	0	0	Year 3	A1
3.	sandwich	23	5	0	Year 4	A1
4.	bread	23	5	0	Year 4	A1
5.	horse	28	0	0	Year 5	A1
6.	grape	21	7	0	Year 3	A2
7.	lion	28	0	0	Year 4	A2
8.	monkey	28	0	0	Year 4	A2
9.	rat	24	4	0	Year 5	A2
10.	rabbit	28	0	0	Year 5	A2
11.	kitten	21	6	1	Year 3	B1
12.	frog	28	0	0	Year 3	B1
13.	shark	26	1	1	Year 4	B1
14.	parrot	22	3	3	Year 5	B1
15.	spider	28	0	0	Year 5	B1
16.	yoghurt	24	4	0	Year 6	A2
17.	duck	27	1	0	Year 6	A2
18.	headache	2	26	0	Year 7	A2
19.	cold (n)	22	5	1	Year 7	A2
20.	temperature	4	21	3	Year 8	A2
21.	tiger	28	0	0	Year 6	B1
22.	lettuce	9	12	7	Year 6	B1
23.	sore throat	0	26	2	Year 7	B1
24.	bleed	3	22	3	Year 8	B1
25.	prescription	2	20	6	Year 8	B1
26.	crocodile	28	0	0	Year 6	B2
27.	spot (on the skin)	3	19	6	Year 7	B2
28.	treatment	0	23	5	Year 8	B2
29.	x-ray	3	19	3	Year 8	B2
30.	infection	3	25	0	Year 8	B2

Appendix C

	WORD	SLOVAK TRANSLATION	RIGHT ANSWER (Number of respondents)	WRONG ANSWER (Number of respondents)	NO ANSWER (Number of respondents)
	apple	jablko	28	0	0
	cat	mačka	28	0	0
	sandwich	sendvič	28	0	0

	bread	chlieb	24	2	2
	horse	kôň	28	0	0
	grape	hrozno	22	6	0
	lion	lev	28	0	0
	monkey	opica	26	2	0
	rat	potkan	26	1	1
	rabbit	zajac (králik)	28	0	0
	kitten	mačiatko	23	2	3
	frog	žaba	28	0	0
	shark	žralok	27	0	1
	parrot	papagáj	23	2	3
	spider	pavúk	28	0	0
	yoghurt	jogurt	28	0	0
	duck	kačica	28	0	0
	headache	bolesť hlavy	21	1	6
	cold (n)	zima/ prechladnutie	21	7	0
	temperature	teplota	22	3	3
	tiger	tiger	28	0	0
	lettuce	šalát	16	1	11
	sore throat	bolesť hrdla	19	1	8
	bleed	krvácať	9	6	13
	prescription	predpis / recept	9	5	14
	crocodile	krokodíl	28	0	0
	spot (on the skin)	vyrážka	4	9	15
	treatment	liečba	2	1	25
	x-ray	röntgen	21	5	2
	infection	infekcia	28	0	0

Lifelong Learning Program To Enhance Local Wisdom Conservation

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Abstract

Local wisdom is closely related to survival skills of people which it was passed through generations to generations. Local wisdom is also considered as learning of the local people from their environments which are results on better quality of their lives. However, in the stream of the capitalism, young generation prefer leaving their hometowns in order to switch way of their lives. So, this situation is a barrier of sustainable development in community. Therefore, the local wisdom conservation should be restorative, particularly by the youths. From these contexts, the study was aimed to 1) analyze curriculum development process 2) analyze contexts of lifelong learning 3) analyze local wisdom conservation guidelines 4) develop lifelong learning program to enhance local wisdom. The documentary analysis was used to be the research instrument. The findings founded that on curriculum development process; 1) need analysis of community and learners; background, problems on economy, society and environment 2) objective setting; expectation on learners' behaviors 3) content Setting; consistent to the objectives and learners needs 4) learning activities setting; appropriate activities selection in order to fulfill the learning objectives 5) adoption; learning lesson plan and instructional media are adopted in practice 6) evaluation in three aspects; content, adoption and results on learners (behaviors, achievements, and characteristics). Results on lifelong learning concept analysis; 1) self-analysis, self-development and self-caring on rapid social transition; new skills, knowledge, attitudes with morality 2) learning flexibility; learning freedom to fulfill their need and blending to their lives 3) social responsibility; fulfillment to individual needs, community needs as well as social needs. Results on local wisdom conservation concept analysis; 1) understanding background and nature of each local wisdom 2) collecting data of the local wisdom, organize, classify, analyze and publicize the wisdom 3) action research in specific local wisdom 4) acceptance and encouragement local people on the value of their wisdoms 5) collaboration between public and private sectors to initiate the network the people neglect to inherit their local wisdoms due to lack of understanding on their local wisdoms' worth. The program was developed by the needs and the satisfaction results on the program were in highest level.

Introduction

New education challenges that countries in Asia and the Pacific are facing, in particular, in expanding participation beyond both ends of basic education, namely early childhood care and education (ECCE) and post basic education, including technical and vocational training and continuing education, and in focusing on learning for the individual to acquire the skills and competences needed for life and work. (UNESCO, 2014) Thus, lifelong education is used for successful development of many countries as well as the concept of lifelong learning is brought to be an instrument for development people. However, Thai society currently confronts with the unbalance of consuming resources of adult population which leads to be social problems. Therefore, lifelong learning concept should be blended for delivering sustainable development. The training courses or program are directly related to lifelong learning in order to encourage desired knowledge, skills and attitudes in a specific period. Lifelong learning is a continuously supportive process which stimulates and empowers individuals to acquire all the knowledge, values, skills and understanding they will require throughout their lifetimes and to apply them with confidence, creativity and enjoyment, in all roles circumstances, and environments (Watson 2003). In accordance with Sirichai Karnchanawasri (1995) which proposed that training is an Education for human resource development under rapid shift situations, training strengthen professional knowledge as well as skills based on their actual needs.

In each community, there are local wisdoms which refer to the knowledge of people or groups of people in one place. It was from the ancestors or from experiences, analysis and use to apply to their lives (Kowit Puangngam, 2010). The matter of using knowledge, skills, beliefs and behaviors represents a holistic relationship among people and people with the environment including other activities which related to their learning adaption as well as surviving of the person community and society. Therefore local wisdom is important and lead to survive of the person in the social economic. Local wisdom also demonstrates the ingenuity, creative thinking to make use of the environment and develop it for better quality and strong society (Phatthavadee Udommonkul, 2002). Wisdom of fundamental living with the ability to find food, house building, invention of fabric and sickness treatment helps the society peaceful (Kanokporn Chimphree,

2012). Refer to the importance of local wisdom, Constitution of the Kingdom of Thailand 2007, the importance of local wisdom is recognized. In Act 66, persons who are in a community have the right to preserve or restore traditional wisdom, arts and cultures of the local community as well as participate in manage, maintain, and utilize natural resources (Constitution of Thailand, 2015: Online). This shows that the conservation on cultural and local wisdom could support self-reliant in the community. In accordance with Thai government policy on local wisdom is consistent with the problem due to the current situations have to be solved, Thailand has entered into globalization and the cultural and technological advancement of the country. Therefore, it may presume that Thai society is currently under western wisdoms, capitalism, materialism and consumerism (Phra Dharmakote Poyutto, 1996). Moreover, Thai people are lacking of understanding and do not appreciate on their wisdoms.

It is essential to preserve local wisdom. And there are people who delight to conserve local wisdom. Elderly is the majority group that role to conserve local wisdoms. Conservation on local wisdom also involves several dimensions such as who wants to preserve, who should be a conservationist, what age should desire to conserve the wisdom, and the steps and strategies of conservation. The study of information obtained from the survey also benefits regarding the creation of training courses for conservation of local wisdom.

The development on lifelong learning program to enhance local wisdom conservation included training program development process and lifelong learning concept as well as local wisdom conservation as the content of the program. The young adults were the target in order to prolong the wisdom. In each community, the study on the priority of the wisdom need was surveyed and the training program was developed by considering on wisdom needs, target needs and community contexts as well as concept of conservation and lifelong learning.

The Study

Documentary analysis was used to study in order to develop framework of the program which analyzed in the topics of instructional curriculum, lifelong learning and local wisdom conservation. The next step was to synthesis to be the lifelong learning program to enhance local wisdom conservation into steps.

Findings

The findings were clarified from the study on the documentary review and analyzed in the form of concept and tables as following:

Results on curriculum analysis

Curriculum development process

1. Need analysis of community and learners; background, problems on economy, society and environment
2. Objective setting; expectation on learners' behaviors
3. Content Setting; consistent to the objectives and learners needs
4. Learning activities setting; appropriate activities selection in order to fulfill the learning objectives
5. Adoption; learning lesson plan and instructional media are adopted in practice.
6. Evaluation in three aspects; content, adoption and results on learners (behaviors, achievements, and characteristics)

Results on lifelong learning concept analysis

1. Self-analysis, self-development and self-caring on rapid social transition; new skills, knowledge, attitudes with morality
2. Learning flexibility; learning freedom to fulfill their need and blending to their lives
3. Social responsibility; fulfillment to individual needs, community needs as well as social needs

Results on local wisdom conservation concept analysis

1. Understanding background and nature of each local wisdom
2. Collecting data of the local wisdom, organize, classify, analyze and publicize the wisdom
3. Action research in specific local wisdom
4. Acceptance and encouragement local people on the value of their wisdoms
5. Collaboration between public and private sectors to initiate the network

The findings could be systematically analyzed in to the table of program framework as following:

Program process	Lifelong learning	Local wisdom conservation	Program content
1. Community education and survey	- lifelong development with morality on current transition - New skills practice for career security	- Performance on conservation - Wisdom adoption in order to solve daily problems	1. Study on current contexts; economy, society, environment 2. Need analysis on local wisdom conservation for lifelong learning

Table 1: The program was designed by analyzing the three concepts; instructional curriculum, lifelong learning and local wisdom conservation (step 1).

Program process	Lifelong learning	Local wisdom conservation	Program content
2. Objective setting; expectation on learners' behaviors	1. Ability to learn for their own benefits and social benefits 2. Ability to search useful information 3. Ability to add knowledge, skills and attitudes to fulfil their needs	1. Value of wisdom has been transferred to young generation 2. Public relation on local wisdom 3. Initiate local wisdom networks for strengthening the wisdom	1. Knowledge, skills and positive attitudes in lifelong learning for local conservation 2. Local conservation in practice; protection, learning and maintenance

Table 2: The program was designed by analyzing the three concepts; instructional curriculum, lifelong learning and local wisdom conservation (step 2).

Program process	Lifelong learning	Local wisdom conservation	Program content
3. Content Setting; consistent to the objectives and learners needs	1. Individual learning; cognitive, affective and psychomotor domain 2. Self caring 3. Social responsibility	1. Wisdom for living; food, medicine and treatment 2. Wisdom for property; housing and career 3. Wisdom for creativity; ancient language, local language and literature	Unit 1: Wisdom conservation Unit 2: Local wisdom Unit 3: Wisdom maintenance

Table 3: The program was designed by analyzing the three concepts; instructional curriculum, lifelong learning and local wisdom conservation (step 3).

Program process	Lifelong learning	Local wisdom conservation	Program content
4. Learning activities setting; appropriate activities selection in order to fulfil the learning objectives	1. Authentic practice, learner center, problem based learning 2. Technology enhancement 3. Flexibility and freedom to learn by desired needs and learning styles	1. Trainers select appropriate learning methods by learners' competency 2. Wisdom transfer by various methods; demonstration, inspection	1. Learning activities; learner center, practice, discussion, knowledge application 2. Media and resources; Local resource, journals, internet, assignments

Table 4: The program was designed by analyzing the three concepts; instructional curriculum, lifelong learning and local wisdom conservation (step 4).

Program process	Lifelong learning	Local wisdom conservation	Program content
5. Adoption; learning lesson plan and instructional media are adopted in practice.	1. Flexibility in learning time and location 2. Learning activities could be blended in their lives	-	<u>Roles of trainers;</u> Well teaching preparation, multi teaching styles, positive learning atmosphere, connecting learning resources to learners' lives <u>Roles of learners;</u> Participate in practice and search their own interests, delight to do the activities by their ability, self information searching

Table 5: The program was designed by analyzing the three concepts; instructional curriculum, lifelong learning and local wisdom conservation (step 5).

Program process	Lifelong learning	Local wisdom conservation	Program content
6. Evaluation in three aspects; (1) content, (2) adoption and (3) results on learners (behaviors, achievements, and characteristics)	1. Presentation and discussion 2. Accurate and precise evaluation target in order to measure learners' achievement 3. Evaluation on learners' project assignments	- Self evaluation on the skills by learners - Individual evaluation - Follow up on learners by giving advices continuously	1. Evaluation on the program be considering; suitability and compatible of the compositions of the program 2. Evaluation on learners' achievement

Table 6: The program was designed by analyzing the three concepts; instructional curriculum, lifelong learning and local wisdom conservation (step 6).

Conclusions

From the results of the study, the lifelong learning program have to be flexible and specify based on the contexts of the community and characteristics of the wisdom. It would be recommended that the effective program in Thailand should be recognized on the importance of “Human Capital” and “Society Capital” in order to drive sustainability as well as well-being of people in community. Thus, government policy and Thai National Economic and Social Development Plan are also necessary to be realized. The program should be depth studied by program manager regarding to provide the valuable and sustainable training program. So, the youths will retain their conscious as well as apply to their community. This may shift the attitude of the trained youths in order to conserve their wisdoms.

However the problems and needs of people in community reflect the necessary of the program development. The issue of local wisdom for community development which effects to people’s living directly always challenges for decades. Thus local wisdom conservation is the main point or instrument to be considered for applying to be lifelong learning program. The program would be adopted based on the real needs of them and community contexts, not only form their answers from the questionnaires, therefore the process of analysis and synthesize the data gathering should be recognized while the proposed program was developed by synthesizing on theories, concept and principles. So the program in practice needs to be tested for studying the generalization of the program.

Finally, the adoption of the program particularly, training for youths in their local community, the learning plan should be set systematically. The unit content as well as learning activities should be well organized by contexts and learners’ needs.

References

- Chimlee, K. (2012). *Knowledge Management Models for Local Wisdom in Wickerwork Handicrafts: A Case Study of Local Community Enterprises in Nakhon Ratchasima Province*. Thesis. Bangkok.
- Karnchanawasri, S. (1995). *Advance Research and Behaviors System Development*. Bangkok Poyutto, D. (1996). *Sustainable Development*. Bangkok.
- Watson, L., 2003, *Lifelong Learning in Australia*, Canberra, Department of Education, Science and Training <http://www.dest.gov.au/NR/rdonlyres/DBF92E32-99DA-4253-9C81F52157022BF6/805/03_13.pdf.
- UNESCO (2014). *The ASIA and Pacific Regional Burea’s Education Support Strategy 2014–2021*, UNESCO.

Linguo-Didactic Aspect Of Axiology

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Abstract

The modern anthropocentric scientific paradigm actualizes the problem of developing a certain basic "coordinate system" for identifying and describing the basic values of representatives of different cultures. And the intensification of scientific research in this direction is explained by it. The results of these studies also make it possible to identify the features of the transformation and preservation of the basic values of the bearers of a particular language and culture, as well as the trends in intergenerational cultural transmission. One of the best ways of transferring culture from generation to generation is to use the linguo didactic potential of axiology as a science of values and evaluation. As it is known, the ultimate goal of linguo didactics is not only teaching a particular language, but also inculcating spiritual, moral and ethical values through the means of the language being taught to the students. It is obvious that the humanitarian culture includes value-orientation, norm-orienting, culture-identical, socially-consolidating and individualizing resources. Accordingly, there is no doubt that it is necessary to form a humanitarian culture in accordance with the gradual principle of education from the first years of study with its further deepening in the upper grades.

Based on this, this article analyzes the ways of forming a humanitarian culture in the teaching of the Russian language. If in the junior classes language learning is carried out on texts presented in textbooks, then, in our opinion, in high school it is advisable to use texts from other sources. As such, there can be artistic or newspaper texts, the students are more interested in the latter. This is due to a number of factors: informative and dynamic in accordance with the genre and the availability of background knowledge about the event described by the students. Regular analysis of newspaper texts with an axiological component allows us to identify the dominant spiritual and moral values of society and determine their scale. Proceeding from this, the actual material for analysis in this article are newspaper texts.

The article proposes an author's method of studying linguistic means and texts containing in their semantics an axiological component in explicit or implicit forms.

Introduction

At the present stage of the development of scientific knowledge all branches of science are permeated with anthropocentrism: all problems are linked to the person and are explained from the standpoint of the person – creator, carrier and researcher. While any person is the bearer of a specific ethnic culture and language, then certainly, and the world is perceived by him through the prism of his native culture. Accordingly, in the linguistic objectification of the realities of reality, in the division of the world, i.e. categorization mentality, perception of the world, the world view and categorization of that ethnos whose representative is a particular person is reflected. And in a modern globalizing world in which it is easy to lose its ethnic identity every member of society tries to identify himself with the native language and the centuries-old culture of his people. And the preservation of national identity is brought to the forefront which is possible only with the continuity of national culture. Its fundamental part is the spiritual, moral and ethical values passed down from generation to generation. And it is very important to form, preserve and develop national identity in the younger generation and at the same time tolerance towards the foreign languages and cultures. In this connection, it is necessary to look for various ways, one of which is humanitarian education through the subjects of the humanitarian cycle studied at school. Among them, of course, are language and literature. Since the study of language is based on texts of different genres, it is expedient to use their inexhaustible possibilities.

Adapted texts presented in school textbooks can be as one source of it. They are designed for their full study

within the program. Their inadequate appeal to the school pupil is its compulsoriness limited to typical programs and educational standards. Another source of extraction of axiological information is classical fiction, a "well" for education. However, it is well known that it is on the periphery of readers' interest of schoolchildren. The most acceptable, in our opinion, source is the online press because for modern children from a small age the most favorite source of information retrieval is gadgets with access to the World Wide Web. The task of the teacher of literature is to form at the student a steady interest in reading, and for this – a thoughtful approach to the selection of texts for reading able to gradually instill values, and thereby develop a scale of values. Therefore, in this article a great attention is paid to the formation of spiritual values through the correct selection of publicist texts.

The Study

The axiological component is one of the key ones in the formation and development of the linguistic personality, and as the primary component of the existence of man in society that's why it arises a great research interest, being an object of independent research in various branches of humanitarian disciplines. At the same time scientists study axiological problems from various perspectives: *axiological* – in philosophy, theology, art criticism, etc., *ontology* – cultural studies, linguistics, folklore, ethno linguistics, etc., *praxiological* – political science, sociology, pedagogy, psychology, etc., *art* – literature study, art criticism, etc. All these approaches are united by an attempt to explain the mechanisms of man's cognition of the world. As it can be seen, there is a close relationship between the subject areas of humanitarian culture and its potential impact on the individual and society. Thus, the axiological aspect includes value and socially-consolidating landmarks, praxeological aspect – normative, cultural-identification, individualizing, etc. [Mussatayeva M., Nussupbekova A. 2018].

As you know, all these guidelines are vital and necessary for a person for harmonious being in society, therefore, the humanitarian culture must be instilled in children from the first days of their schooling by the resources of all the without exception studied disciplines. A special place is given to the subjects of the philological cycle: Russian language and literature, Kazakh language and literature, foreign languages. However, the limited scope of typical programs, in accordance with the textbooks and materials which are attached to them, make this work somewhat difficult. In this regard, this task implicitly lies on textbooks in which this goal is achieved through the texts, the fulfillment of tasks and exercises by pupils, the use of various methods and innovative technologies by teachers [Mussatayeva M.Sh., Nussupbekova A.S. 2018].

Since the central place at all stages of education including language teaching is the textbook, much attention is paid to its content. In the linguo didactic literature there are many definitions of the textbook. One of the co-authors of this article, A.S. Nussupbekova defines the textbook as "a poly functional psycho didactical system reflecting the content of the studied subject compiled taking into account the psycho physiological characteristics of students and aimed at the formation of spiritual, moral and ethical values, and thereby – knowledge of the world" [Nussupbekova A. 2018, P. 349]. As it is known, the textbook realizes the general educational, developing and upbringing functions of pedagogy. The first two of these equip schoolchildren with theoretical knowledge of the subject, develop educational and cognitive activities, the latter forms the outlook of the students and fosters educates human values at them.

Proceeding from this, we think that the central place in textbooks should be occupied not only by texts in which the scientific, consistent, strictly and accurately stated content of the subject is presented, but also materials oriented toward cognition of both universal and cultural-marked values. So, Z.K. Akhmetzhanova and M.Sh. Mussatayeva describe the concepts of *man, state, cradle, generation, child, boy, girl*, etc., which are constants of the Kazakh mentality, the "permanent principle" of Kazakh culture, and verbalizing their lexemes refer to a stable layer of Kazakh vocabulary that defines wealth, "face" and the power of the Kazakh language [Akhmetzhanova Z., Mussatayeva M. 2013, P. 3]. For Kazakhstani researchers, it is of particular importance to identify the scale of values of the Kazakh society and the factors that contribute to its transformation with the aim of reconstructing the axiological sphere of various social groups and dialects. In our opinion, the results of these studies should also be reflected in the training texts.

In addition, it seems that the text material in the textbook should take into account the achievements of modern linguistics, therefore it is advisable to introduce new concepts such as *concept, conceptual analysis, discourse* that allow a new look at the educational process and choose adequate pedagogical technologies and techniques for their implementation (for example, the concepts of *spirituality, education, culture*, etc.) Thus, the school textbook on the Russian language and literature is intended to be one of the sources of humanitarian culture at schoolchildren.

Axiological value categories are directly related to the *concept*. According to V.I. Karasik, "the value aspect of the concept is the basis for distinguishing the concept, it is namely through the analysis of concepts that value dominants can be identified that together form a certain type of culture, maintained and preserved in language" [Karasik V. 2009, P.29-30]. As one of the authors of this article, M.Sh. Mussatayeva points out "At the basis of any culture and ethnic identity is a system of values, that is, moral and ethical and spiritual and moral concepts, in a multinational, multicultural and poly confessional Kazakhstan, Kazakh identity is a consolidating resource and a guarantor of its sustainable and dynamic development. In Kazakhstani society along with universal concepts

reflecting universal spiritual and moral values, social and economically conditioned concepts are also dominant" [Mussatayeva M. 2017, P. 127]. Proceeding from this, it is difficult to overestimate the role of axiological competence in the formation of a full-fledged linguistic personality.

According to the theory developed by the Russian scientist Yu.N. Karaulov, the structure of the language personality includes 3 levels: *verbal-semantic* (encompassing a complex of grammatical-paradigmatic, semantic-syntactic and associative links of linguistic units which together form a single "verbal network"), *linguo cognitive* (the representatives of generalized concepts, ideas and concepts clad in descriptor status) and *motivational and pragmatic* (more individualized consisting of the same elements: units, relations and stereotypes). According to the scientist, the necessary key for the transition from one level to another can be "extra linguistic information supplied by the social component of the language and associated with the "history" of the language socialization of the individual, the "history" of its involvement in the stereotypes adopted in a given society in the vital concepts, ideas, the history of their assimilation and appropriation in the process of socialization" [Karaulov Yu. 2010, P. 45].

As it can be seen, in the formation of the verbal network, the generalized large concepts and their individualization in the language personality, the values and the evaluation reflected in the pedagogical discourse are implicitly "present". This is confirmed by V. Karasik's definition of the concept of *pedagogical discourse* is "an objectively existing dynamic system of value-semantic communication of subjects of the educational process, functioning in the educational environment. It includes participants in discourse, pedagogical goals, values and content component" [Karasik V. 2000].

Obviously, the role of extra linguistic information extracted from the media and contributing to the successful socialization of the language personality of the learner is important in the structure of the language personality in ensuring the transition from one level to another. A private, at first glance, issue of selecting publicist texts for educational purposes requires interrelation and correlation with such key aspects of education as the main goal with the tasks corresponding to it, the structural and content components of education that ensure successful interaction of participants in the educational process and mutual understanding. The effectiveness of the meanings of the concepts and images acquired by the students depend on these factors, in our case is the assimilation of the spiritual, moral and ethical values necessary for the formation of a harmoniously developed linguistic personality. As a rule, the system of values/antivalues is studied on the basis of a variety of texts, which is due to a rich set of components, including axiological ones, allow explicitly or implicitly in accordance with the author's conception and interpretation to realize this task.

The axiological component is most actively studied in the language of the media, since they are the most stable media carrier, fully reflecting the dynamics of linguistic changes. Among the various media genres, in most cases the source of the extraction of factual material is newspaper texts of informational orientation, since they do not need to be pre-recorded. Accordingly, there is no need for subsequent decoding, because they are more accessible and convenient for a linguistic description. The research interest in the language of newspapers is also conditioned by the fact that the newspaper is the oldest mass medium in which the basic stylistic devices and means characteristic of the language of mass communication as a whole were formed. Proceeding from this, the language of the newspaper is quite reasonably considered to be the basic component of the language of the media [Mussatayeva M., Kozhakhmetova A. 2018]. This circumstance serves as the basis for the use of newspaper texts for the purpose of teaching the language. In its turn, the didactic task of forming a steady interest in reading the newspaper as a valuable source of information contributing to the awareness of the involvement of the socium and its civil identity, is being actualized. In addition, the culture of reading newspapers and skills of extracting basic information is being instilled.

An indispensable condition for the use of journalistic texts in the educational process is their adaptation in accordance with the psychological and physiological characteristics of students. This means that in the learning texts of each of the links (primary, secondary and senior), a gradual principle, from simple to complex, must be realized. To realize it in textbook development should be used the theoretical bases for the compilation of educational texts, adaptation of artistic texts for educational purposes, and the scope and structure of the teaching texts [Nussupbekova A. 2018].

There is no doubt that the involvement of journalistic texts adapted for educational purposes will contribute to the full development of the individual student's language that suggests the presence of a multi-level set of language ability and willingness to perform communicative speech acts of varying difficulty on the verbal-semantic, cognitive and communicative-activity levels. Reading and comprehension of the content of the text, performance a set of learning tasks and exercises form the system of linguistic competence, which includes language and speech levels. While working on adapted journalistic texts students master communicative abilities in the four major types of speech activity – reading, speaking, listening, writing. In addition, this form of work increases the cognitive competence of students, forming specific skills, in particular:

- ✓ to operate with background knowledge of your culture and adequately interpret them in relation to reality;
- ✓ to identify the dominant concepts of linguistic culture of modern society;

✓ to perceive and comprehend the axiological stereotypes of society.

One of the unshakable constant values of Kazakhstan is the family, as evidenced by the number of articles published in the Kazakh press. So, for the period from January 1 to July 1, 2018, the family problem was addressed in 186 articles of the daily central socio-political newspaper "Kazakhstanskaya Pravda". The fact that in Kazakhstan to family values are paid special attention is shown by a large number of publications in other publications. In this regard, it should be noted that in them the central place is given to the woman as the keeper of the family hearth.

It is obvious that values should not be merely declarative, they should be educated in the younger generation, for which this work should be permanent in both life and learning process. In implementing this task in the learning process, reliance on well-established methods is important, one of which can be the developed by us an algorithm for carrying out the content analysis of an artistic text and reflected in one of our works [Mussatayeva M.Sh., Kuatova G.A., etc. 2017]. This algorithm can be taken as a basis for work on the semantics of the publicist text and be used as follows:

- ✓ to specify the purpose and tasks of work on the text;
- ✓ to select text material;
- ✓ to identify the language units in the text;
- ✓ to analyze the semantic structure of identified linguistic units;
- ✓ to classify language units;
- ✓ to interpret;
- ✓ to formulate conclusions.

We will try to demonstrate the tasks developed with the use of the above said algorithm. *The purpose* of these tasks is the realization of the axiological component of journalistic texts in the educational process, and *the tasks* are aimed at achieving the stated goal:

1) formation of skills in the logical-semantic analysis of the text providing a deep understanding of the information contained in it;

2) identification of the nominee field of representatives representing the dominant ideas of the text;

3) formation of axiological competence of students;

4) provision of a cultural transmission, i.e. *continuity of traditional ethnic values and their transformation into a modern scale of values*;

5) the formation and development of linguistic competence through the analysis of linguistic units contained in the text, and also by the attraction of additional language tools that provide an expanded understanding of the axiological components.

Selected material is fragments of journalistic texts containing axiological information which are extracted from the socio-political Russian-language newspaper "Kazakhstanskaya Pravda" and other online publications. These texts correlate with the State Program of the Republic of Kazakhstan "Rukhani zhangiru" ("Spiritual Revival") developed on the basis of the article of the Head of State "A Look into the Future: Modernization of Public Consciousness" dated April 12, 2017, aimed at reviving the spiritual values of Kazakhstan with all modern risks and challenges of globalization. [<http://ruh.kz/ru>; <http://www.akorda.kz>].

Within the framework of this article we only outline the nature of assignments for comprehending three fragments of texts about the family and family values.

Task 1 Formulate the basic idea of each of the texts.

1) "In our society the family has always been and remains the link between different generations, the guardian of spiritual and cultural traditions. The family day will contribute to strengthening morality, spirituality, unconditional recognition in our society of the importance of responsible marriage ... Education got under shanyrak is the guarantee of a healthy and the successful future of all our people. Cultivation of family values, large families is one of the primary tasks of our state. For the years of Independence, more than 6 million of Kazakhstanis was born, and the total number of citizens of the country exceeded 17 million. This is a clear indication of the growth of the well-being of the people, the quality of family and demographic policy in the Republic of Kazakhstan", – points out Nazarbayev. <https://tengrinews.kz>

2) "In the middle of the 21st century the most developed countries will be those in which the absolute majority of families will live in peace and prosperity, educate children, give them quality education, take care of older generations, lead a healthy lifestyle," said the President of Kazakhstan Nursultan Nazarbayev <http://today.kz/news/kazakhstan/2015-09-13/626287> from the 13th of September. 2015 11:10 1219 0

3) "About family values, jubilee weddings were spoken under the arches of the new Palace of Marriage ... Spouses especially honor continuity, family traditions, spiritual and moral values. ... The institute of a strong, happy family is the guarantee of the well-being of the whole of Kazakhstan, "the Akimovs' spouses also firmly believe in it. ... The family is strong, if it is understood and respected, "say the Akimovs. "We have always lived a soul in the soul, honored the elders, worked tirelessly" ("... Golden, Emerald, Diamond" in the newspaper "Kazakhstanskaya Pravda" dated June 8, 2018) ..

Task2 Do you agree with the statements below? Motivate your answer.

The family has always been and remains the link between different generations, the guardian of spiritual and cultural traditions.

Education received under the family shanyrak is the guarantee of a healthy and successful future for all our people.

Cultivating family values, having many children is one of the primary tasks of our state.

The family is strong, if it is understood and respected for each other.

Task 3 Answer the following questions:

1. What theme unites these micro texts?
2. How do you understand the meaning of the phrase *family values*?
3. Explain the meaning of the combinations of *living the soul in the soul, to work tirelessly*?
4. What is the manifestation of caring for the older generations?
5. How do you think what is the *right way of life*?

Task 4 Select keywords.

Task 5 Give the phraseology units about the family.

Task 6 Give the proverbs and sayings about the family.

As you can see, the first four tasks are aimed at forming the semantic competence of students.

Tasks 5 and 6 are designed to inculcate axiological competence. It is well-known that to understand the meaning of phraseology and paremia, background knowledge is necessary: traditions and customs accompanying the bearers of ethnic culture and language throughout life and forming life values. It is obvious that life situations and certain patterns of behavior of the bearer of a particular national language and culture reflect the ethnic hierarchy of values, a certain influence on which is exerted by the confessional identity of the linguistic personality. In this case, Kazakh paremia will be accompanied by ethnographic comments which will allow us to understand its logical content. At the same time, in the meaningful and formal description of paremia in Kazakh and Russian languages, universality is noted irrespective of ethnic characteristics, which indicates a unified cognitive and logical structure of thinking of genetically diverse peoples. Family values and priorities, particularities of the way of life are vividly reflected in proverbs and sayings about the family, about the attitude to the elder members of the family and children, about upbringing. A person in a system of kinship ties occupies a certain place and, in accordance with this, he is endowed with specific rights and duties, a certain emotional relationship is formed towards him [Mussatayeva M.Sh., 2015].

Analysis of the semantic structure of linguistic units assumes the identification of semantic components. So, in axiological units, you can identify such components as *cognitive, emotional and behavioral*, which are especially shown in paremia. *The cognitive* component expresses the parents' attitudes and shapes the model of the future family at children (educate worthy children; do not give preference to any of the children; how to raise the elders, so will the younger ones be raised), *the emotional* component expresses the different attitude of parents towards children, and *the behavioral* component is clear in attitude towards representatives of the older generation. It should be noted that the senior generation is given a particularly honorable place in the Kazakh family. As a rule, in the Kazakh family, 2-3, sometimes 4 generations, traditionally live together which has a great educational effect: children, on the example of parents learn to take care of elderly people. The law in any Kazakh family goes without saying: elderly parents always live with children, until the end of their life, feeling the care of children, grandchildren and great-grandchildren. It is noteworthy that the idea of the arrangement of aged parents in boarding schools is inadmissible for Kazakhs [Mussatayeva M., 2015]. This unshakable constant of the Kazakh scale of values should be passed down from generation to generation. In connection with globalization processes, this problem becomes especially urgent, because it is obvious that the loss of this value is equal to the loss of Kazakh national identity.

Findings

From these fragments of the text it can be concluded about the role of today's Kazakhstani family in shaping the future of Kazakhstan's society. Keywords and phrases that characterize the future of Kazakhstan as a result of the culture of family values are: *tranquility, prosperity, quality education, raising children, caring for the older generation, a healthy lifestyle, a happy family, to live in perfect harmony, respect for elders, continuity, family traditions, spiritual and moral values, well-being*. The main tasks are promoting the most important human values in society, that, first of all – FAMILY, LOVE, LOYALTY, RESPECT, UNDERSTANDING. The family has no confessional boundaries. Family traditions of each nationality, religion are based on loyalty and love. BNews.kz. (Source: Almaty City Culture Department)

Examples similar to the following fragments of newspaper texts can be "dissolved" in exercises and assignments, the linguistic and semantic analysis of which at the subconscious level of students will contribute to a deep understanding and sustainable respect for family values as an axiological constant. It should also be noted that a high degree of authenticity of newspaper texts. So, in the educational process M. Breen clears out four types of authenticity: 1. authenticity of texts used in the learning process; 2. the authenticity of the perception of these texts by students; 3. authenticity of training tasks; 4. authenticity of the social situation in the classroom. [Breen 1985] Reliance on the basic provisions developed by this scientist will allow the teacher to develop a typology of tasks and on their basis a system of exercises.

Interpretation

Semantisation of newspaper texts used for educational purposes can be based on the Bloom taxonomy, which includes organically related levels: *knowledge, understanding, application, analysis, synthesis* and *evaluation*.

At the level of *knowledge*, when semantizing the newspaper text to identify the axiological component, the following knowledge is formed and developed: *conceptual* (the interaction between the basic elements in the integral structure of the language), *procedural* (skills of using task execution algorithms) and *meta cognitive* (awareness and knowledge of one's own knowledge in the process of working on text). Students discover new facets of the category of values in different cultural communities, identifying in them universal ones.

At the level of *understanding* students learn to recognize the meaning of linguistic units and interpretations, motivation of their responses, classification of the received information, comparison with other events from the life of society, generalization and formulation of conclusions. The indicator of *understanding* can be the transformation of material from one form of expression to another, the interpretation of the material.

At the *application* level trainees are trained to use the information obtained in specific conditions and new practical situations.

At the level of *analysis*, analytical skills are formed consisting in the classification of the basic concepts in the semantized text in such a way that it is possible to reveal the semantic structure of the described object. Mental actions consist of identifying the part of the whole, their interconnection, the principles of the organization of the whole, and also in distinguishing between facts and consequences.

At the *synthesis* level the skills of combining elements are formed in order to obtain a whole that has novelty. At this stage it is difficult to overestimate the role of the integrated use of audio-visual aids which contribute to a more visual representation of the synthesized components of the object.

At the *evaluation* level students should be able to make independent judgments and determine their own values, check them for compliance with generally accepted spiritual, moral and ethical values, identify gaps between them and work on their replenishment.

Conclusions

Thus, axiological linguistics has a huge linguo didactic potential, which contributes to the formation of a harmoniously developed personality with a stable scale of spiritual, moral and ethical values. It becomes obvious that in order to achieve this goal, it is not enough to restrict the learning of only the information contained in the textbooks. To do this, it is necessary to attract a variety of sources, one of which may be a journalistic text. As it is known, art texts adapted for educational purposes, with all their merits, have a number of shortcomings: the use of developed grammatical structures, even in dialogue or in answering questions; unnatural repetition of individual words or grammatical phenomena; text is often not an analogue of any real type or genre of text. The advantage of using publicist texts is their authenticity, which allows to develop tasks, simulate situations that are as close to natural as possible in accordance with three aspects of a methodically authentic text: methodical (accessibility, relevance to learning objectives, efficiency), structural (compositional and linguistic characteristics, composition, adequacy of linguistic means, cohesion, adhesion, etc.) and meaningful (the naturalness of the situation described, the presence of a cultural component, informative, ability to evoke interest and emotional perception et al.).

References

- Mussatayeva M.Sh., Nussupbekova A.S. (2018) The Role of the School Textbook on the Russian Language and Literature in the Formation of the Humanitarian Culture of Students // LingvLit. Scientific Almanac 2 (2 *) - Almaty, - P. 263-272
- Karaulov Yu.N. (2010) Russian language and language. Ed. 7th. Moscow: LKI Publishing House (263 p.).
- Karasik V.I. (2000) On the types of discourse // Language personality: institutional and personal discourse. Volgograd:, P.5 - 20.
- Nussupbekova A.S. (2018) Pedagogical discourse as an object of scientific research // Vestnik PSU. Philological Series, Special Issue. Pavlodar. - P. 349-360
- Mussatayeva M.Sh. (2017) Image-forming strategies and technologies (based on Kazakhstan online publications) // Ekshembeeva L.V., Nurshaikhova Zh.A., Mussatayeva M.Sh. Technologies and techniques of discourse influence. Collective monograph. - Almaty: Kazakh University. - P. 89 -147.

- Mussatayeva M.Sh., Kozhakhmetova A.S. (2018) Axiological research in Kazakhstani linguistics // Vestnik KSU. Philological Series, №2 - Kokshetau.
- Karasik V.I. (2009) Language keys. - Moscow: Gnosis. - P. 29-30
- Akhmetzhanova Z.K., Mussatayeva M.Sh. (2013) Actual problems of linguocognitology and linguoculturology. The monograph. Almaty. - 232 p.
- Nussupbekova A.S. (2018) Linguodidactic potential of adapted texts in school textbooks//Problems of poetics and versification-XIII. - Almaty. - P. 422-425
- The State Program of the Republic of Kazakhstan "Ruhani zhangiru" ("Spiritual Revival") // N.Nazarbayev "A look into the future: modernization of public consciousness" April 12, 2017 <http://ruh.kz/ru>; <http://www.akorda.kz>
- MussatayevaM.Sh., Kuvatova G.A., Nussupbekova A.S., Esirkeyeva D.A. Training of students-philologists methods of conducting content analysis // International Education Technology Conference / TOJET ISSN 2146 - 7242. - Boston: Harvard, USA, August 16-18, 2017. - P. 726-734
- Breen M. P. Authenticity in the Classroom. Applied Linguistics. 1985. № 6/1. P. 60-70.

Maria Gaetana Agnesi: New Way to Teach Maths is in the Past?

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Abstract

Maria Gaetana Agnesi was born in Milan, on May 16, 1718. She was highly talented and excelled in the art of philosophical disputation. In 1738, Agnesi concluded her studies with the publication of her thesis *Propositiones philosophicae* (Philosophical Propositions), mimicking the academic path of male students in contemporary colleges. Profoundly interested in mathematics but still unclear about the nature of her possible contribution, Agnesi began by planning a commentary on Guillaume de l'Hospital's treatise on curves, to make it more accessible to students. Gradually, however, she worked on a much more ambitious project: an introduction to calculus that would guide the beginner from the rudiments of algebra to the new differential and integral techniques. This would be a great work of synthesis, aiming at a clear presentation of materials that were written for specialists, in Latin, French, or German and published in hard-to-find journals. During the making of her book, Agnesi interacted with leading Italian experts, such as Jacopo Riccati. At a time when the practice of calculus on the continent was moving away from its immediate geometrical meaning, Agnesi aimed to rediscover those techniques of Cartesian geometry designed to bridge the gap between the geometrical and analytical fields. Her teaching method can be still interesting. Maria Gaetana and her contemporaries do not care about logical rigour; they prefer to present the concept in an intuitive way. The question of giving a more formal and logical approach to the definition of limit was addressed by Augustin-Louis Cauchy and, later, by Karl Weierstrass. According to any scholars, this abstract approach can be didactically inefficient for the beginner student, observing that, among other things, a mathematics course uses different notions of limit for which it would be appropriate to introduce and define the limit so that applications come from a single concept. The question of the fundamentals of the analysis cannot be considered completely closed; indeed someone thinks that the system of axioms to be considered is even variable with the type of problems that are faced.

Keywords: *Mathematics, History, Differential Calculus*

Introduction

Maria Gaetana Agnesi was the first woman to publish a book of Mathematics in her own name, a treatise of Algebra and Calculus entitled *Instituzioni Analitiche ad uso della gioventù italiana* (Analytical Institutions for the use of Italian Youth). The book appeared in 1748 in Milan that in this time was under Austrian control. In the introduction, dedicated to Empress Maria Theresa of Austria, Maria Gaetana called for all women to contribute "to the glory of their sex" through the practice of the Arts, the Sciences and Politics.

The *Instituzioni* did not assume any previous knowledge of algebra and was the first attempt to provide an extensive and accessible introduction for the beginners to the new differential and integral techniques. This aim was reached by means a great work of synthesis because the materials were mostly written for specialists, in Latin, French or German and published in hard-to-find journals. Some results were even in writings that scholars addressed each other. During she made her book, Maria Gaetana interacted with leading Italian experts, such as Jacopo Riccati. In the correspondence with Riccati, Maria Gaetana claimed that she consciously excluded from her book the possible applications to Physics or other Sciences. This choice was unusual and at odds with the practice of most specialists, including Riccati. Her geometrical understanding of Algebra and Calculus was in disagreements with leading practitioners. This choice explains her interest in Newton's fluxions and the case with which *Instituzioni* was translated in English, for the British audience in 1801.

Agnesi claimed that she wanted to limit her book to the pure Analysis in order to preserve the simplicity, rigor and evidence proper to classical Geometry. This inclination was inspired by the Oratorian tradition in Mathematics, descending from Malebranche and Charles Reyneau, which, in particular, was the main source of inspiration for the *Instituzioni*. Maria Gaetana did not neglect the appeal of the Leibniz's *differences* method that she knew to be equivalent to Newton's method. In her book, she used the differential calculus both in tangent problems and in inverse tangent problems.

The Second Volume Of *Instituzioni Analitiche*

Maria Gaetana devoted the Second Volume to “*the analysis of the quantities infinitely small*”. In the Introduction, she wrote that the *Analysis of infinitely small Quantities*, which is otherwise called the *Differential Calculus*, or the *Method of Fluxions*, is that which is conversant about the differences of variable quantities, of whatever order those differences may be. This Calculus contains the methods of finding the Tangents of Curve-Lines, of the Maxima and Minima of Quantities, of Points of Contrary Flexure and of the Regression of Curves, of the Radii of Curvature, etc. The book is divided in several sections, as the nature of the several objects require. All translation of notations, definitions, theorems and demonstrations that follow in this paper are taken from the English translation made by Rev. John Colson (Colson, 1801).

In Volume II, Book II, Section I, Agnesi defines the *Variable Quantities* as the quantities that are capable of continual increase or decrease. They are to be conceived as *Flowing Quantities* or as generated by a continual motion (Agnesi, 1748).

Then she defines *Difference* or *Fluxion* as any infinitely little portion of a variable quantity, when it is so small that it has to the variable itself a less proportion than any that can be assigned and by which the same variable being either increased or diminished, it may still be conceived the same as at first.

In Table I, Fig.2,3 of the Volume II, Maria Gaetana clarifies the concept (Agnesi, 1748)

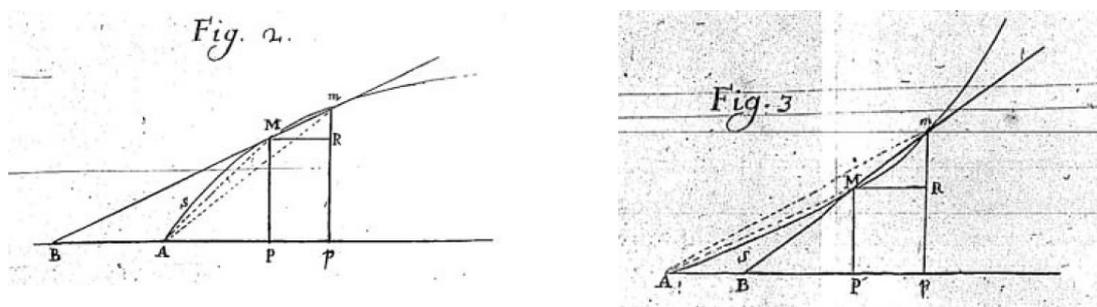


Figure 1. *Instituzioni Analitiche*, Volume II, Book II,Section I, Table I

Let AM be a curve whose axis or diameter is AP; and, if in AP produced, we take an infinitely little portion Pp, it will be the difference or fluxion of the abscissa AB, and therefore the two lines AP, Ap may still be considered as equal, there being no assignable proportion between the finite quantity AP and infinitely little portion Pp.

From the Points P, p if we raise the two parallel ordinates PM, pm in any angle and draw the chord mM produced to B, and the right line MR parallel to AP; then because the two triangles BPM, MRm are similar, it will be BP:PM=MR:Rm. But the two quantities BP, PM are finite and MR is infinitely little, the also Rm will be infinitely little and is therefore the fluxion of the ordinate PM. For the same reason the chord Mm will be infinitely small, but (as will be shown afterwards) the chord Mm does not differ from its little arch, and they may be taken indifferently for each other; therefore the arch Mm will be an infinitely little quantity, and consequently will be the fluxion or difference of the arch of the curve AM. Hence it may be plainly seen, that the space PMmp likewise, contained by the two ordinates PM, pm, by the infinitesimal Pp and by the infinitely little arch Mm, will be the fluxion of the area AMP, comprehended between the two co-ordinates AP, PM, and the curve AM. In addition, drawing the two chords AM, Am, the mixtilinear triangle AMm will be the fluxion of the segment AMS, comprehended by the chord AM and by the curve ASM.

The teaching method of Agnesi is truly remarkable, she always points straight to the concept, which she clarifies with many examples and figures. In the definition of difference or fluxion lies a crucial point: a positive infinitesimal should be a quantity greater than zero but less than any positive real number. There is therefore a contradiction with the Archimedes axiom which states that if *a* and *b* are two positive real numbers, then there exists a natural number *n* such that $an > b$.

The objection made by Berkeley, in his satirical book *The Analyst* (Berkeley, 2002) hits the mark: he does not dispute the validity of the results obtained with the new Calculus, but the logical rigor.

In fact, it is necessary to observe that, in the fervour of research and in the urgency of solving new problems, the preoccupation with regard to the foundational aspects of the infinitesimal calculus is left aside. The few books born for spreading the methods, such as that of de L'Hôpital, do not care much about clarifying the definitions.

Agnesi And Geometrical Loci

Agnesi's first mathematical effort was connected with De L' Hôpital 's *Traité des sections coniques* (De L' Hôpital, 1776); she wanted to write an introduction that made it accessible to students and designed a commented translation, but her mentor Count Carlo Belloni dissuaded her, considering the project too demanding. Maria

Gaetana worked hard, also receiving explanations concerning some of her questions from her correspondents among the different religious orders that have frequented her home or entertained relationships with her preceptors. De L'Hôpital's treatise differs entirely from the approach of a similar treatise by Guido Grandi, which presented itself as a compendium to the text of Apollonius and thus defined the curves as sections of the cone.

De L'Hôpital focuses instead on the construction of the conics based on their properties as flat curves and treats problems of searching for geometric locus.

Proof of the study of Maria Gaetana of this treatise are the numerous autographed letters of the collections of the Ambrosiana library, cited by Arnaldo Masotti (Masotti, 1940). In particular, in the autograph letter addressed to Count Belloni, reported in Table XVII (Masotti, 1963), Maria Gaetana treats, expressing herself in Latin, the problem that appears as Exemple V in Livre VIII *Des Problèmes Indéterminés*, see p. 259. Maria Gaetana solves the problem, using differential methods in Volume II, Book IV (Problem III, n.42, pp. 945-950), (Agnesi, 1748). Volume II, Book IV of *Instituzioni Analitiche* concern the Inverse Method of Tangents (Agnesi, 1748). The meaning of these methods has shown below.

As, when any curve is given, the manner of finding its tangent, subtangent, perpendicular or any line of that kind, is called the Direct Method of Tangents; so, when the tangent, subtangent, perpendicular or such any line is given, or when the rectification or area is given, to find the curve to which such properties belong, is called the Inverse Method of Tangents.

In the second and third books are found the general differential expressions of tangents and also of rectifications and areas, therefore, by comparing the given property with the respective expression or general differential formula, there will arise a differential equation of the first degree, or of a superior degree, which, being integrated, will give the curve required.

Problem III: *Given infinite parabolas of the same kind, we must find the curve, which cuts them all at right angles.*

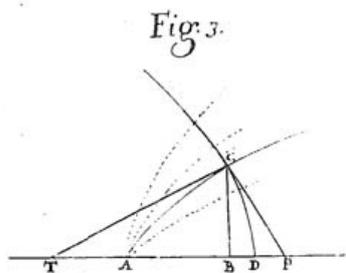


Figure 2. *Instituzioni Analitiche*, Volume II, Book IV, Table I

Solution

Let $AB=x$ and $BC=y$. The equation of the infinite parabolas is

$$p^{m-n}x^n = y^m.$$

For any point C we consider the tangent line CT and the normal line CP. We have $BT=mx/n$.

We find the curve DC. The infinitesimal portion of the curve is the normal CP; then CT in the same time the tangent line to the parabola AC and the normal line to the curve DC in the point C. Then BT is the sub tangent to the parabola and the subnormal to DC. The subnormal is $-ydy/dx$, and then we have the differential equation

$$\frac{mx}{n} = -\frac{ydy}{dx}.$$

We use the separating variables method

$$\frac{mxdx}{n} = -ydy$$

We integrate, obtaining

$$\frac{mxx}{2n} = -\frac{yy}{2} + aa$$

$$\frac{nyy}{m} = \frac{2naa}{m} - xx$$

That is the equation of ellipse.

Agnesi And Differential Of Several Orders

In Volume II, Book II, Section I, Theorem III, Maria Gaetana states the infinitesimal order degree of the trigonometric function (Agnesi, 1748).

Theorem III

If in the circle be taken an arch which is an infinitesimal of the first order, I say that its versed sine shall be an infinitesimal of the second order; and the difference between the right sine and the tangent shall be an infinitesimal of the third order.

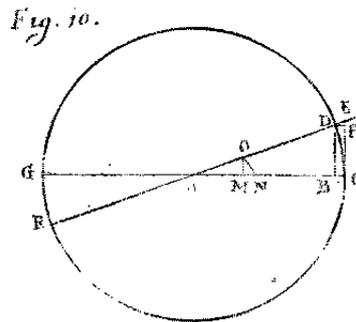


Figure 3. Instituzioni Analitiche, Volume II, Book II, Section I

Let the arch DC be an infinitesimal of the first order, DB is the right sine, CE the tangent and let DF be drawn parallel to AC. From the nature of the circle, it is $GB:BD=BD:BC$. But GB is a finite quantity and BD an infinitesimal of the first order. Therefore, as GB is infinitely greater than BD, so BD will be infinitely greater than BC. Therefore, BC or DF will be an infinitesimal of the second order. By the similitude of the triangles ABD, DEF, it will be $AB:BD=DF:FE$. But AB, a finite quantity, is infinitely greater than BD, an infinitesimal of the first order, and therefore DF, an infinitesimal of the second order, will be infinitely greater than FE, which is therefore a third fluxion, or an infinitesimal of the third order.

Corollary I: And whereas the tangent is always greater than its arch, the arch greater than its chord, and the chord greater than the right sine, the tangent and the right sine may be assumed as equal, they not differing but by an infinitesimal of the third order. Also these following may be assumed as equal, the tangent, the arch, the chord, and the right sine.

Corollary II: If we conceive the radius of the circle AN to be an infinitesimal of the first order, the arch NO and its right sine OM will be an infinitesimal of the second order; and therefore the versed sine MN will be infinitesimal of the third order.

Agnesi proved by means of a geometrical approach the well-known infinitesimal properties of the function $\sin x$ and $1-\cos x$ for x tending to 0, with the advantage of obtaining the result with a very simple reasoning, which can also follow a beginner student.

The Foundational Question

In the nineteenth century, a great process of reorganizing knowledge affected Mathematics. New mathematical sectors are born, such as that of non-Euclidean geometries, and a rigorous theoretical arrangement of mathematical analysis is realized. The construction of coherent systems of geometries, characterized by postulates other than Euclidean ones, proved the limited mathematical value of the appeal to evidence. Even the situation of the Analysis stimulates a reflection: although it was decisive for the development of the sciences, it had made use of not clear notions, such as that of infinitesimal, and of unscrupulous procedures, so that D'Alembert said "Go ahead and faith will come to you". The question of giving a more formal and logical approach to the definition of limit was dealt with by Augustine-Louis Cauchy and, later, by Karl Weierstrass. In Cauchy's book *Cours d'Analyse* of (1821), he based the definition of infinitesimal and the definition of limit on the concept of variable quantity, which scholars generally believe is a succession of values.

When the successive numerical values of this variable diminish indefinitely, so as to fall below a given number, this variable becomes what we call infinitesimal, or an infinitely small quantity.

Weierstrass resumed the Cauchy's ideas and gave the definition ϵ - δ of limit that is still taught, which eliminates infinitesimal as separate subjects. Weierstrass applied the definition to the definition of continuity and convergence of a series of functions and produced the famous counterexample for which a function can be continuous but not derivable at any point. From Weierstrass onwards, Mathematical Analysis became the science we know.

According to some scholars, this abstract approach can be didactically not very effective for the beginner student; we observe that, among other things, in a mathematical course different notions of limit are used, in every situation the most opportune one: for example the limit of a succession, of a function, of a series, the definition of integral. Therefore, it would be appropriate to introduce and define the limit so that applications derive from a single concept.

In 1961, Abraham Robinson published an article in Dutch Academy of Sciences in which he presented his idea of a theory of infinitesimal and infinite, with the name of Non-Standard Analysis, entering the debate on how the definition of Weierstrass interprets the historical definition (Robinson, 1961).

Robinson's theory achieved great notoriety following the work he presented jointly to the American Mathematical Society and the Mathematical Association of America.

Robinson's theory consists in introducing a new numerical field, which constitutes an expansion of the real field, in which the axiom of Archimedes does not generally apply. The extra objects in the new numerical field are precisely the infinitesimals, called hyperreals.

The Robinson's theory is based essentially on mathematical logic, even though towards the end of the sixties the American mathematician H. Jerome Keisler managed to reformulate the whole Mathematical Analysis according to the infinitesimal principle of Robinson, following a path alternative that makes this method even accessible to university freshmen (Keisler, 2012).

Nowadays many researchers in Mathematical Teaching test the Nonstandard Analysis even at introductory level. They think that an intuition of infinitesimals can be oriented to lead to mathematical concepts. Pre-university students can acquire the fundamental ideas, which form the core of analysis through a nonstandard analysis; in particular, they present in class the ultrasmall numbers.

In these experiences in classroom, they propose again many examples and ideas that we find in Agnesi's *Instituzioni*.

Conclusions

The opinions on the didactic use of non-standard analysis and precisely on the advantage that would lead to the understanding of the arguments are still controversial, as well as those regarding the advantage that it would bring in the discovery of new analytical properties.

The question of the foundations of Analysis cannot be considered completely closed, indeed someone think that the system of axioms to be considered is even variable with the type of problems that must be addressed. It would be a terrible blow to Descartes' conception, according to which "Mathematical truths are immutable and eternal".

We think that pre-university students can acquire the fundamental ideas of differential calculus getting back the original formulation of Leibniz, based on infinitesimals. From this point of view, we can use many suggestions and examples, contained in Agnesi's Books. If we propose these arguments or problems by means of laboratory instruments, flipped classroom techniques, or by didactical methods that you prefer, we think that the media are different but the meaning is the same.

References

- Agnesi M.G. (1748). *Instituzioni Analitiche*. TomoI, Tomo II. Retrived from https://archive.org/details/bub_gb_xDF_ksE24HUC , https://archive.org/details/BUSA298_184
- Aldegheri, L., & Stecca, B. (2017). L'Analisi non standard nell'opera di Maria Gaetana Agnesi. *VII Giornata Nazionale di Analisi non standard per le scuole superiori*. Atti del Convegno. (pp. 99-112). Venezia
- Berkeley, G. (2002). *The Analyst*. London. David R. Wilkins.
- Borovik, A., & Katz, M.G. Who gave you the Cauchy–Weierstrass tale? The dual history of rigorous calculus. ArXiv:1108.2885v3[MATH.HO] 16 Oct. 2012.
- Bouyer de Fontenelle, B. Eloge du P. Reyneau. (1728). *Histoire de L'Académie Royale des Sciences* (p. 112). Retrived from <http://gallica.bnf.fr/ark:/12148/bpt6k35908/f1.image>.
- Cauchy, A.L. (1821). *Cours d'Analyse*. Retrived from <https://archive.org/details/coursdanalysede00caucgoog>
- Colson, J. (1801). *Analytical Institutions, in four books originally written in Italian by Donna Maria Gaetana Agnesi*. London. Taylor and Wilks.
- Dauben, J.W. (1984). *Abraham Robinson and Nonstandard Analysis: History, Philosophy, and Foundations of Mathematics*. Minnesota Center Retrived from http://mcps.umn.edu/philosophy/11_7Dauben.pdf
- De L' Hôpital, G. (1776) *Traité des sections coniques*. Retrived from <https://gallica.bnf.fr/ark:/12148/bpt6k1042799f.image>
- Dupont, P., & Roero, C. (1991). *Leibniz 84. Il decollo enigmatico del calcolo differenziale*. Rende. Mediterraneo Press.
- Giusti, E. (1988). Il calcolo differenziale tra Leibniz e Newton. Torino. *Rend. Sem. Mat. Univers. Politecn. Torino* (46)1
- Grabner, J.V. (1981). *The origins of Cauchy's rigorous calculus*. New York. Dover Publications Inc.
- Keisler, H.J. (2012). *Elementary Calculus. An Infinitesimal Approach*. Retrived from <https://www.math.wisc.edu/~keisler/calc.html>
- Lubet, J-P. (2005). *Le calcul différentiel et intégral dans l'Analyse démontrée de Charles René Reyneau*. Société Diderot. Retrived from <http://rde.revues.org/304>, 2005.

- Masotti, A. (1940). Maria Gaetana Agnesi. *Rendiconti del Seminario Matematico e Fisico di Milano*. XIV. Milano
- Masotti, A. (1963). Matematica e Matematici nella storia di Milano. *Rendiconti del Seminario Matematico e Fisico di Milano*. XXXIII. Milano.
- Neovius, S. (2013). René Descartes' Foundations of Analytic Geometry and Classification of Curves. *U.U.D.M. Project Report 2013:18*.
- O'Donovan, R. (2017) Nonstandard Analysis in the Classroom ultrasmall numbers vs limits: a comparison. *VII Giornata Nazionale di Analisi non standard per le scuole superiori. Atti del Convegno*. (pp. 35-44). Venezia
- Robinson, A. (1961). Non-Standard Analysis. *Proceedings of the Royal Academy of Sciences (Serie A)* 64. (pp. 432-440). Amsterdam.
- Robinson, A. (1966). *Non-Standard Analysis*. Princeton. Princeton University Press.

Maria Gaetana Agnesi: There Is No Innovation Without Memory

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Abstract

Maria Gaetana Agnesi was born in Milan on May 16, 1718 so this year marks the 300th anniversary of his birth. She is "considered to be the first woman in the Western world to have achieved a reputation in mathematics." The most valuable result of her labours was the *Instituzioni analitiche ad uso della gioventù italiana*, (Analytical Institutions for the Use of Italian Youth) which was published in Milan in 1748 and "was regarded as the best introduction extant to the works of Euler." The goal of this work was, according to Agnesi herself, to give a systematic illustration of the different results and theorems of infinitesimal calculus. The *Instituzioni* did not assume any previous knowledge of algebra and was the first attempt to provide an extensive and accessible introduction for the beginners. In this article, we present two significant problems, which one can find in her book and that could even be put back into our high schools now. The two problems Maria Gaetana found in the Renaissance Mathematical tradition: the first is the famous problem about King Hiero's crown, that we find in Vitruvius and Galileo Galilei, and, after Maria Gaetana, in Paolo Romeo da Siderno. The four solutions are very different each other. The second problem is an application of logarithms to a problem of everyday life that we can find in more elementary form in Luca Pacioli's *De Viribus Quantitatis*.

Keywords: *Mathematics, History, Algebra, Differential Calculus*

Introduction

Profoundly interested in mathematics but still unclear about the nature of her possible contribution, Agnesi began by planning a commentary on Guillaume de l'Hospital's treatise on curves, to make it more accessible to students. Gradually, however, she came to believe she could work on a much more ambitious project: an introduction to calculus that would guide the beginner from the rudiments of algebra to the new differential and integral techniques. This would be a great work of synthesis, aiming at a clear presentation of materials that were written for specialists, in Latin, French, or German, and published in hard-to-find journals. During the making of her book, Agnesi interacted with leading Italian experts, such as Jacopo Riccati. Her correspondence with Riccati sheds light on some of the distinctive traits of Agnesi's mathematical style.

In marked disagreement with leading practitioners was Agnesi's geometrical style, which originated in her essentially geometrical understanding of algebra and calculus.

This explains, among other things, her interest in Newton's fluxions, and the ease with which her work was translated into English for a British audience. At a time when the practice of calculus on the continent was moving away from its immediate geometrical meaning, Agnesi aimed to rediscover those techniques of Cartesian geometry designed to bridge the gap between the two fields.

This inclination explains her interest for the Oratorian tradition in mathematics, and especially for authors like Malebranche and Charles Reyneau. The reference to Reyneau as her main source of inspiration for the *Institutions* has surprised many readers, as he was hardly considered a valuable resource for mid-eighteenth-century continental mathematicians, and was often described as a pedantic and obscure writer. To Agnesi, however, Reyneau offered an example of how to understand recent developments in calculus within an essentially Cartesian framework.

Agnesi believed that calculus was the most subtle branch of mathematics, and therefore that it required the highest level of concentration and the strongest intellect. Once one realizes that for Agnesi the preeminent role of calculus is precisely that of exercising the intellect, it becomes understandable why she decided to ignore completely its empirical and applicative dimension.

Maria Gaetana Agnesi's Short Biography

Maria Gaetana Agnesi was born in Milan, to a wealthy and literate family. Her father Pietro Agnesi, a wealthy silk merchant, wanted to elevate his family into the Milanese nobility. In order to achieve his goal, he had married Anna Fortunato Brivio in 1717. Her mother's death provided her the excuse to retire from public life. She took over management of the household. She was one of 21 children. Maria was recognized early on as a child prodigy; she could speak both Italian and French at five years of age. By her eleventh birthday, she had also learned Greek, Hebrew, Spanish, German, and Latin, and was referred to as the "Seven-Tongued Orator".



Figure 1. Maria Gaetana Agnesi

When she was fifteen, her father began to regularly gather in his house a circle of the most learned men in Bologna, before whom she read and maintained a series of theses on the most abstruse philosophical questions. Records of these meetings are given in Charles de Brosses' *Lettres sur l'Italie* and in the *Propositiones Philosophicae*, which her father had published in 1738 as an account of her final performance, where she defended 190 theses.

After having read in 1739 the *Traité analytique des sections coniques* of the Marquis Guillaume de l'Hôpital, she was fully introduced into the field in 1740 by Ramiro Rampinelli, an Olivetan monk who was one of the most notable Italian mathematicians of that time. During that time, Maria studied with him both differential and integral calculus. Her family was recognized as one of the wealthiest in Milan.

She is "considered to be the first woman in the Western world to have achieved a reputation in mathematics." The most valuable result of her labours was the *Instituzioni analitiche ad uso della gioventù italiana*, (Analytical Institutions for the Use of Italian Youth) which was published in Milan in 1748 and "was regarded as the best introduction extant to the works of Euler." The goal of this work was, according to Agnesi herself, to give a systematic illustration of the different results and theorems of infinitesimal calculus. The model for her treatise was *Le calcul différentiel et intégral dans l'Analyse* by Charles René Reyneau. In this treatise, she worked on integrating mathematical analysis with algebra. The first volume treats of the analysis of finite quantities and the second of the analysis of infinitesimals.

A French translation of the second volume by P. T. d'Antelmy, with additions by Charles Bossut (1730–1814), was published in Paris in 1775; and *Analytical Institutions*, an English translation of the whole work by John Colson (1680–1760), the Lucasian Professor of Mathematics at Cambridge, was published in 1801. The work was dedicated to Empress Maria Theresa, who thanked Agnesi with the gift of a diamond ring, a personal letter, and a diamond and crystal case. Many others praised her work, including Pope Benedict XIV, who wrote her a complimentary letter and sent her a gold wreath and a gold medal.

In writing this work, Agnesi was advised and helped by two distinguished mathematicians: her former teacher Ramiro Rampinelli and Jacopo Riccati.



Figure 2. Instituzioni Analitiche, Volume I

After the death of her father in 1752, she carried out a long-cherished purpose by giving herself to the study of theology, and especially of the Fathers and devoted herself to the poor, homeless, and sick, giving away the

gifts she had received and begging for money to continue her work with the poor. In 1783, she founded and became the director of the Opera Pia Trivulzio, a home for Milan's elderly, where she lived as the nuns of the institution did. On 9 January 1799, Maria Agnesi died poor and was buried in a mass grave for the poor with fifteen other bodies.

Instituzioni Analitiche: Clarity And Simplicity

In the Author's Preface to the readers, Maria Gaetana Agnesi wrote:

*I desire that the candid reader to consider that, as the Sciences are daily improving, and, since the publication of the aforementioned book, many important and useful discoveries have been made by many ingenious writers; as had happened likewise to those who had written before them: Therefore, to save students the trouble of seeking for these improvements, and newly-invented methods, in their several authors, I was persuaded that a new Digest of Analytical Principles might be useful an acceptable. The late discoveries have obliged me to follow a **new arrangement of the several parts**; and whoever has attempted any thing of this kind must be convinced, how difficult it is to hit upon such a method as shall have a **sufficient degree of perspicuity, and simplicity, omitting every things superfluous, and yet retaining all that is useful and necessary**; such, in short, as shall proceed in that **natural order, in which consists the closest connexion, the strongest conviction, and the easiest instruction**. This **natural order** I have always had in view; but whether I have always been so happy as to attain it, must be left to the judgement of others. (English Translation by J. Colson, 1801).*

The opinions on the mathematical work of Maria Gaetana Agnesi is still controversial, mainly because she does not discovery new analytical properties.

The work does not excel in originality; ... but it is distinguished by clarity and rigor of style and by numerous and interesting applications; consequently... it was judged so favorably as to arouse the enthusiasm of some (Loria, G. 1950).

Maria Gaetana Agnesi was famous in her time, mainly as an isolated, unique, female prodigy, a marvel first of precocious learning, later of Catholic piety. Misty fame still clings to her memory, long nourished by the occasional curiosity of mathematicians and now revived by feminists. Whether or not she was as a mathematician important in any sense -discoverer, propagator, teacher- can be determined, but her brief and intense devotion to elementary mathematics cannot be separated from her strange circumstances and strange life, and as her story unfolds, a certain unity, at first unexpected, can be perceived in it. (Truesdell, J. 1989).

Luigi Pepe describes AGNESI'S book as an *exposition by examples rather than by theory*. (Pepe, L. 1982).

However, the same could be said of John Bernoulli's integral calculus, written in 1691 and 1692, published in 1742. All of Euler's books are full of examples.

Many elementary textbooks today, especially those used in courses for engineers, physicists, and economists, are of that kind as far as concerns mathematical thought, but they usually offer redeeming examples of how to apply calculus to problems suggested by natural or fancied phenomena. In our opinion, Maria Gaetana makes a more general vision of problems and contributes to favour the mathematical abstraction.

The First Volume Of Instituzioni Analitiche

Maria Gaetana devoted the First Volume to "*The Analysis of Finite Quantities*":

- I. Notions and Operations of the Analysis of Finite Quantities
- II. Equations and Plane Determinate Problems
- III. Construction of Loci, not exceeding the Second Degree
- IV. Solid Problems and their Equations
- V. Construction of Loci which exceed the Second Degree
- VI. Method *De Maximis et Minimis*, Tangents of Curves, Contrary Flexure and Regression making use only of *Common Algebra*

In this Volume, Maria Gaetana makes many examples and solve many problems, in order to teach to her readers how they can use the algebraic tools. Some problems belong to the Renaissance Italian Treatise; among them, we consider the famous Hiero's crown question.

Hiero's Crown Tale

For almost a hundred years, the ancient Greek city of Syracuse had been at war with Carthage. Until, in 275 BCE, the Syracusan troops, tired of the inefficiencies of their leaders, elected commanders from amongst themselves. One of these was a young general called Hiero. After a great battle in 265 BCE, in which Hiero led the Syracusans to victory against their enemies, the people of Syracuse chose Hiero to be their king.

Hiero was grateful to the gods for his success and good fortune, and to show his gratitude, he decided to place in a certain temple, a golden crown in their honour. The crown was to be shaped like a laurel wreath. Hiero weighed

out a precise amount of gold, and appointing a goldsmith, commanded him to fashion out of the gold a wreath worthy of the gods. The goldsmith did as he had been ordered, and he delivered to the king an exquisitely wrought crown. The wreath seemed to weight exactly as much as the gold that the king had given the goldsmith. Hiero prepared for the ceremony to place the wreath in the temple that he had chosen. However, a few days before the ceremony, he heard rumours that the goldsmith had cheated him, and given him a crown not of pure gold, but of gold that had silver mixed in it. Hiero was furious to learn that he might have been tricked and wished to determine the truth before he punished the goldsmith. Hiero believed there was only one man in Syracuse capable of discovering the truth and solving his problem. This was his cousin, Archimedes, a young man of 22, who was already renowned for his work in mathematics, mechanics and physics.

The story of Archimedes and the golden crown is found in *De Architectura* or *The Ten Books of Architecture*, written by the Roman architect Marcus Vitruvius Pollio some time during the first century BCE. This story is not found anywhere among the known works of Archimedes, though in his book, *On Floating Bodies*, he gives the principle known as Archimedes' Principle, which states that a body partially or completely immersed in a fluid is buoyed up by a force equal to the weight of the fluid displaced by the body.

What Archimedes had found was a method for measuring the volume of an irregularly shaped object. He realised that an object, when immersed in water, displaced a volume of water equal to its own volume, and that by measuring the volume of the displaced water, the volume of the object could be determined, regardless of the object's shape. Therefore, he could measure the volume of the crown by measuring the volume of the water spilled from a container filled with water to the brim when the crown was fully dipped in it.

In physics, when we speak of the density of an object, we are comparing its mass with its volume, or, in simpler words, considering how heavy it is in relation to its size. Archimedes knew that gold was denser than silver – so a piece of gold weighing a certain amount would be smaller than a piece of silver weighing the same. Thus, if the goldsmith had stolen some of the gold the king had given him, and replaced it with an equal weight of silver in the crown, then the total volume of the gold+silver crown would be greater than the volume of the original amount of gold. So now, all that remained for Archimedes to do was to compare the volume of the crown to the volume of the amount of gold that Hiero had given the goldsmith. The simplest method of determining the volume of the crown would have been to melt it down, shape it into a cube and measure its volume. However, Hiero had given strict instructions that the crown was not to be damaged in any way.

Archimedes took a lump of gold and a lump of silver, each weighing the same as the crown, and filled a large vessel with water to the brim, precisely measuring how much water was contained in the vessel. He then gently lowered the lump of silver into it. This caused as much water to spill out over the sides of the vessel as was equal in volume to the lump of silver. Archimedes took the lump of silver out of the water and carefully measured the amount of water left in the vessel, thus arriving at the amount of water that had been displaced by the silver. He again filled the vessel with water to brim, taking care to fill it with exactly the same amount of water as before. He then lowered the lump of gold into the water, and let the water displaced by it spill out over the sides. Then, doing as he had done with the lump of silver, Archimedes took out the lump of gold from the water, and arrived at the amount of water that had been displaced by the gold. He found that a smaller quantity of water had been displaced by the gold than the silver, and the difference was equal to the difference in volume between a lump of gold and a lump of silver of the same weight. He filled the bowl with water to the brim a final time, taking care to fill it with exactly the same amount of water as before. This time he lowered the crown into the water. He knew that if the crown was pure gold, its volume would be the same as that of the lump of gold and that it would displace the same amount of water as the gold. However, if the goldsmith had replaced some of the gold with silver, then the volume of the gold+silver crown would be greater than the volume of the gold, and so the crown would displace more water than the gold. Archimedes found that the crown did, in fact displace more water than the lump of gold of equal weight. Thus he concluded that the crown was not pure gold, and that the goldsmith had indeed mixed some silver (or other, lighter metal) into the gold in an attempt to cheat the king.

The method that Vitruvius says was used by Archimedes, though correct in theory, has been criticised by scientists as too difficult to implement with the amount of accuracy that would be needed to detect a component of silver or other lighter metal in the crown.

The largest known golden wreath from Archimedes' time is the one pictured from Vergina. It has a maximum rim diameter of 18.5 centimetres and a mass of 714 grams, although some of its leaves are missing. Let us assume that Hiero's wreath weighed 1000 grams and that a container with a circular opening of diameter 20 centimetres was used. The opening would then have a cross-sectional area of 314 square centimetres. Because gold has a density of 19.3 grams/cubic-centimetre, 1000 grams of gold would have a volume of $1000/19.3 = 51.8$ cubic-centimetres. Such a quantity of gold would raise the level of the water at the opening of the container by $51.8/314 = 0.165$ centimetres. Next, suppose the dishonest goldsmith replaced 30% (300 grams) of the gold in the wreath by silver. Silver has a density of 10.5 grams/cubic-centimetre and so the gold-silver crown would have a volume of $700/19.3 + 300/10.5 = 64.8$ cubic-centimetres. Such a crown would raise the level of the water at the opening by $64.8/314 = 0.206$ centimetres. The difference in the level of water displaced by the wreath and the gold is thus 0.206 minus 0.165 centimetres, or 0.41 millimetres. This is much too small a difference to accurately observe directly or

measure the overflow from considering the possible sources of error due to surface tension, water clinging to the gold upon removal, air bubbles being trapped in the lacy wreath, and so forth. Additionally, the change in water level would be even less than 0.41 millimetres if the wreath had a mass of less than 1000 grams, or if the diameter of the container opening were larger than 20 centimetres, or if less than 30% of the gold was replaced with silver.

Medieval Treatise On Density

A Latin treatise on determining the volume or density of an object or liquid entitled “Liber Archimedis de insidentibus in humidum” (“The Book of Archimedes on Floating Bodies”) circulated in the middle ages. However, it is generally believed that Archimedes did not write it, although his works on hydrostatics clearly underlie it. It possibly dates from the 12th or 13th century.

The treatise begins with fourteen definitions and six postulates, which set the stage for eight propositions. The fourth of the propositions explains how to determine the composition of an object that is an alloy of two metals by weighing the object in air and in water and weighing quantities of the two metals in air and in water. This proposition thus presents a solution to the Golden Crown problem, although no specific mention is made of the problem in the treatise.

IV. IN A BODY MIXED FROM TWO KINDS, TO DETERMINE HOW MUCH OF EACH KIND IS IN IT.

If there be given some body mixed from two known kinds of body, and if we wish to know how much of each kind is in it, we will weigh bodies of each kind, separately, in both air and water; and we will take the excesses of the weight of each body in air over its weight in water, and note them separately. Then we will weigh the mixed body in both air and water, and we will note the excess of its weight in air over its weight in water. Then the ratio of the quantity of light body present in the alloy, to the magnitude of the alloy itself, will be as the ratio of the excess weight of the alloy to the excess weight of the lighter body.

(The Medieval Science of Weights – Scientia de Ponderibus – Treatise ascribed to Euclid, Archimedes, Thabit ibn Qurra, Jordanus de Nemore and Blasius of Parma.)

Galileo Galilei And The Small Balance

In 1586 at the age of 22, Galileo (1564-1642) wrote a short treatise entitled La Bilancetta (“The Small Balance”). He was sceptical of Vitruvius’s account of how Archimedes determined the fraud in Hiero’s crown. The amounts of gold and silver in the case of a crown were so small that the difference in their volumes, and the consequent difference for water displaced, would be too small to measure with precision with the measurement methods available to Archimedes. In his treatise, Galileo presented his own theory based on Archimedes’ Law of the Lever and Law of Buoyancy. He also included a description of a hydrostatic balance that determined the precise composition of an alloy of two metals.

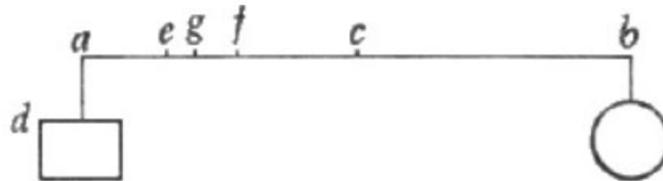


Figure 3. Galileo’s Small Balance- scheme

Let us then assume that weight b is gold and that when this is weighed in water, the counterpoise goes back to e; then we do the same with very pure silver and when we weigh it in water its counterpoise goes in f. This point will be closer to c [than is e], as the experiment shows us, because silver is lighter than gold. The difference between the distance af and the distance ae will be the same as the difference between the [specific] gravity of gold and that of silver. However, if we shall have a mixture of gold and silver it is clear that because this mixture is in part silver it will weigh less than pure gold, and because it is in part gold, it will weigh more than pure silver. If therefore we weigh it in air first, and if then we want the same counterpoise to balance it when immersed in water, we shall have to shift said counterpoise closer to the point of suspension c than the point e, which is the mark for gold, and farther than f, which is the mark of pure silver, and therefore will fall between the marks e and f. From the proposition in which the distance ef will be divided, we shall accurately obtain the proportion of the two metals composing the mixture. So, for instance, let us assume that the mixture of gold and silver is at b, balanced in air by d, and that his counterweight goes to g when the mixture is immersed in water. I now say that the gold and silver that compose the mixture are in the same proportion as the distances fg and ge. We must however note that the distance gf, ending in the mark for silver, will show the amount of gold, and the distance ge ending in the mark for gold will indicate the quantity of silver; so that, if fg will be twice ge, the said mixture will be of two [parts] of gold and one of silver. Thus, proceeding in this same order in the analysis of other mixtures, we shall accurately determine the quantities of the [component] simple metals.

In the Museum Galileo in Florence, Room VIII, there is a small, blown-glass hydrostatic balance that consists of an arm suspended on a fulcrum at its centre. A small sealed glass sphere hangs from one end of the arm; a small basket containing crystal fragments hangs at the other end. The balance measures the density of fluids. This is done by immersing the glass sphere in a fluid. To counterbalance the buoyancy of the fluid and keep the balance in equilibrium, it is necessary to place a weight (corresponding to a certain number of crystal fragments) in the basket. The denser the fluid, the fewer the crystal fragments needed to achieve equilibrium. The instrument combines the principles of Archimedean upward thrust and of Galileo's *bilancetta* (small balance).

In Galileo's opinion, Archimedes suspended the wreath from one end of a scale and balanced it with an equal mass of gold suspended from the other end. Then he immersed the suspended wreath and gold into a container of water. If the scale remained in balance then the wreath and the gold had the same volume, and so the wreath had the same density as pure gold. However, if the scale tilted in the direction of the gold, then the wreath had a greater volume than the gold, and so its density was less than that of gold. It must then be an alloy of gold and some lighter material.

To check the practicality of this technique let us again assume a 1000-gram wreath, which is an alloy of 70% gold and 30% silver. Because its volume is 64.8 cubic centimetres, it displaces 64.8 grams of water. (Water has a density of 1.00 gram/cubic-centimetre). Its apparent mass in water is thus 1000 minus 64.8 grams, or 935.2 grams. Next, 1000 grams of pure gold has a volume of 51.8 cubic centimetres, and so its apparent mass in water is 1000 minus 51.8 grams, or 948.2 grams. Thus, when both ends of the scale are immersed in water, there is an apparent mass of 935.2 grams at one end and an apparent mass of 948.2 grams at the other end, an imbalance of 13.0 grams. Scales from Archimedes' time could easily detect such an imbalance in mass. Additionally, sources of error arising with Vitruvius's method (surface tension and clinging water) would not arise with this scale method. It should be remarked that the scale method still works if the masses of the wreath and the gold are not equal. One simply adjusts their distances from the fulcrum of the scale until the scale balances before dipping them into the water.

Maria Gaetana Agnesi And Crown's Problem

In Volume I, Section I, Problem III, p.122, Agnesi introduced the question how to find the quantity of the gold and of the silver mixed in the Hiero's crown, if it is known the crown's mass and the density of the gold and of the silver.

Solution: let m be the crown's mass, p_c the crown's density, p_g the gold's density, p_s the silver's density. We suppose that $\frac{p_g}{p_s} = \frac{19}{10+\frac{1}{3}}$ and $\frac{p_g}{p_c} = \frac{19}{17}$. If x is the weight of the gold, the weight of the silver is $m-x$. Then, if we considers the volumes, we have

$$\frac{m}{17} = \frac{x}{19} + \frac{m-x}{10+\frac{1}{3}}. \text{ We solve: } \frac{(19-10-\frac{1}{3})x}{19(10+\frac{1}{3})} = \frac{(17-10-\frac{1}{3})m}{17(10+\frac{1}{3})} \text{ and then } x = \frac{190}{221}m.$$

If, for example, the mass of crown is 5 marks (about 1174.98 grams), x is about 1010.17 grams and $m-x$ is about 164.82 grams. Mark is the ancient weight measure's unity for the precious metals.

Father Paolo Romeo Da Siderno Solution

In 1842, Paolo Romeo da Siderno, published the book *Lezioni elementari di aritmetica propriamente dimostrativa* (Elementary lessons in demonstrative mathematics). In this book (Lecture XXXIX "About the problems solved with the rule of Alligation", p.191), he shows his solution of the Hiero's problem as a special case of the rule of alligation. The mathematical operation called "alligation", a term that means "tying together", was usually presented near the end of arithmetical texts, presupposing a knowledge of the rules of proportion.

There are two main types of alligation: "alligation medial" for simple problems and "alligation alternate" for use when varied quantities and elements are to be mixed. Most commonly, the examples used to explain alligation involved grains, metals, wines or spices.

Father Paolo says that we must produce two crowns similar to the Hiero's crown. The first is made of pure gold and the second made by pure silver.

$$\begin{aligned} \text{Weight of the goldsmith crown} &= 15 \\ \text{Weight of the gold crown} &= 19 \\ \text{Weight of the silver crown} &= 10 \\ \text{Difference between the goldsmith crown and the silver crown} &= 5 \\ \text{Difference between the goldsmith crown and the gold crown} &= 4 \\ \text{Sum of the differences} &= 9 \end{aligned}$$

Therefore, Padre Paolo concludes that in the goldsmith crown we have that $\frac{5}{9}$ are in gold and $\frac{4}{9}$ are in silver.

The Second Volume Of *Instituzioni Analitiche*

Maria Gaetana devoted the Book III of the Second Volume to "*Integral Calculus*":

- I. Rules of Integrations expressed by Finite Algebraical Formulae, or which are reduced to supposed Quadratures
- II. Rules of Integrations, having recourse to Infinite Series
- III. The Rules of the foregoing Sections applied to the Rectification of Curve-lines, the Quadratures of Curvilinear Spaces, the Complanation of Curve Superficies, and Cubature of their Solids
- IV. The Calculus of Logarithmic and Exponential Quantities

Among the problem that Maria Gaetana solved in Section IV, we consider the application of logarithm to a problem of everyday life, that we can find in more elementary form in Luca Pacioli's *De Viribus Quantitatis*.

Application Of Logarithm

In Book III, p.244, Maria Gaetana introduced this problem:

A vessel being given of a known capacity, full of any liquor, suppose wine, out of which is drawn a draught of a given quantity and then the vessel is filled up with water. Of this mixture of wine and water another draught is drawn equal to the former, and the vessel is again filled up with water. Again of this mixed liquor another such draught is drawn out; and the same operation is continually repeated in the same manner. It is demanded how many such draughts may be drawn out, or how many times the operation must be repeated, that a given quantity of wine may be left in the vessel.

Solution

a = vessel capacity

b = quantity of each draught.

In the first draught, a quantity of wine equal to b is removed, and because we add a quantity of water equal to b , the quantity of wine in the vessel is equal to $a-b$.

In the second draught, will be drawn out the quantity b of the mixture, so that to have a quantity x of pure wine contained in the vessel, we must make this analogy: $a : b = (a - b) : x$. Then $x = \frac{ab-b^2}{a}$ is the quantity of pure wine that is drawn out at the second draught, and there remains in the vessel the quantity of pure wine $\frac{a^2-2ab+b^2}{a} = \frac{(a-b)^2}{a}$.

In the third draught, will be drawn out the quantity b of the mixture, so that to have a quantity x of pure wine contained in the vessel, we must make this analogy: $a : b = \frac{(a-b)^2}{a} : x$. Then $x = \frac{b(a-b)^2}{a^2}$ is the quantity of pure wine that is drawn out at the third draught, and there remains in the vessel the quantity of pure wine

$$\frac{(a-b)^2}{a} - \frac{b(a-b)^2}{a^2} = \frac{(a-b)^3}{a^2}$$

Then, after n draughts, there will be left in the vessel the quantity of pure wine

$$\frac{(a-b)^n}{a^{n-1}}$$

Therefore if we want to know how many draughts must be taken so that there should remain in the vessel a given quantity of pure wine, for example $\frac{a}{m}$ part of the whole, we must solve the equation

$$\frac{(a-b)^n}{a^{n-1}} = \frac{a}{m}$$

Where, because n is an unknown number, will be an exponential quantity.

$$\frac{(a-b)^n}{a^{n-1}} = \frac{a}{m} \Rightarrow \log \frac{(a-b)^n}{a^{n-1}} = \log \frac{a}{m} \Rightarrow n \log(a-b) - (n-1) \log a = \log a - \log m \Rightarrow$$

$$n \log(a-b) = n \log a - \log m \Rightarrow n = \frac{\log m}{\log a - \log(a-b)}$$

Conclusions

We think that pre-university students can acquire the fundamental mathematical ideas using also everyday problems. From this point of view, we can use many suggestions and examples, contained in Agnesi's Books. If we propose these arguments or problems by means of laboratory instruments, flipped classroom techniques, or by didactical methods that you prefer, we think that the media are different but the meaning is the same.

References

- Agnesi M.G. (1748). *Instituzioni Analitiche*. TomoI, Tomo II. Retrived from https://archive.org/details/bub_gb_xDF_ksE24HUC , https://archive.org/details/BUSA298_184
- Aldegheri, L., & Stecca, B. (2017). L'Analisi non standard nell'opera di Maria Gaetana Agnesi. *VII Giornata Nazionale di Analisi non standard per le scuole superiori*. Atti del Convegno. (pp. 99-112). Venezia
- Alexanderson, G.L. (2013). About the cover: Maria Gaetana Agnesi – a divided life. *Bulletin of American Mathematical Society*, 50. (pp. 147-152).

- Bernardini, G. & Fermi, L. (1961). *Galileo and the Scientific Revolution*. Basic Books, Inc. New York.
- Bouyer de Fontenelle, B. Eloge du P. Reyneau. (1728). *Histoire de L'Académie Royale des Sciences* (p. 112).
URL:<http://gallica.bnf.fr/ark:/12148/bpt6k35908/f1.image>.
- Colson, J. (1801). *Analytical Institutions, originally written in Italian by Maria Gaetana Agnesi*. Taylor and Wilks. London.
- Dupont, P., & Roero, C. (1991). *Leibniz 84. Il decollo enigmatico del calcolo differenziale*. Mediterraneo Press, Rende.
- Galilei, G. (1644). La bilancetta. https://it.wikisource.org/wiki/La_bilancetta.
- Grabiner, J.V. (1981). *The origins of Cauchy's rigorous calculus*. Dover Publications, Inc., New York.
- Loria, G. (1950). *Storia delle Matematiche dall'Alba della Civiltà al Secolo XIX*. Hoepli. Milano
- Mazzotti, M. (2007). *The World of Maria Gaetana Agnesi, Mathematician of God*. The Johns Hopkins University Press. Baltimore.
- Neovius, S. (2013). René Descartes' Foundations of Analytic Geometry and Classification of Curves. *U.U.D.M. Project Report 2013:18*.
- Paolo Romeo of Siderno. (1842). *Lezioni Elementari di Aritmetica propriamente dimostrativa*. Stamperia e Cartiere del Fibreno. Napoli. https://archive.org/details/bub_gb__xocvpmjatYC
- Pepe, L. (1982). "Sulla trattatistica del calcolo infinitesimale in Italia nel secolo XVIII". *Atti del Convegno "La Storia delle matematiche in Italia"*. (pp. 145-227). Cagliari.
- Truesdell, C. (1989). Maria Gaetana Agnesi. *Archive for History of Exact Sciences*, 40 (pp.113-142).

Married Immigrant Women In Daily Cultural Community In Korea Rural Area: An Ethnography Of Multicultural Community

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Abstract

The purpose of this study is to explore a multicultural community of married immigrant women as an ethnographic case, and to discuss the cultural implications of this community for Korean society and immigrants. The research site for this study is a “peace room” which has a ten-year history as open community for married immigrant women. We visited the peace room every week from March to June 2016, and collected data through participatory observation and interviews. We interviewed twelve married immigrant women in the community. We found that cultural practices in the peace room were not focusing on overturning or resisting to the existing values or order. Instead, the married immigrant women who participated in cultural practices in the peace room positively understood, experienced, and utilized the value of the rural mainstream society. We found that the efforts of the multicultural community to adapt to Korean value and language have led to meaningful changes for both the village and the married immigrant women. This study suggests that married immigrant women can act as cultural agents in the society.

Keywords: *Daily cultural community, Rural, Married immigrant women, Ethnography, Peace room*

Introduction

This study considers a multicultural community in a rural area as a 'daily cultural community.' The purpose of this study is to present the characteristics of the multicultural community as an ethnographic case and to discuss its cultural implications in Korean society.

Until now, multicultural policy in Korea has focused on married immigrant women as a primary target and worked on educational programs for those women and their children. Particularly, for adaptation of married immigrant women to Korean society, Korean society has dealt mainly with their issues of adjustment, identity formation, and social interaction, based on the public education system such as 'Multicultural (Education) Center.' However, there is criticism that there is no multicultural in the curriculum (Joongang Sunday, April 9, 2017). It is said that the multicultural center should be called as 'Korean culture center', if foreigners merely learn how to learn Korean and how to make Kimchi in the center. Although cultural absorption rather than coexistence of culture has been sought as criteria to evaluate their adjustment or maladjustment, Korea should be aware of a reality that there are 2 million immigrants and about 140,000 married immigrants (7% of foreigners).

Many studies have focused on the cultural practices of everyday life, such as family life, food, language, and education, which are experienced by married immigrant women in their adaptation process to Korean society (Kim, 2014; Kim, 2014; Oh et al, 2014; Yoon, 2005). These studies assume that it may be danger of fixing a reality as a stereotyped image, if representation is based on those women's statements without considering patio-temporal contexts in their adaptation processes. Thus, it is also culturally significant since it focuses on those women's everyday cultural practices such as consciousness and emotion

Ethnography Site

Panorama of a open room

This study's research field is located in a home of a severely handicapped couple, who is living in a rural village in J-district, A city. This research field is referred as a “peace room.” The peace room started from an accidental meeting of a Philippine woman who lived in the village as a married immigrant woman in 2007 with another woman Su (pseudonym). At that time, Su took the role of friend and Korean teacher at her request, and B social welfare office in A city proposed to make a multicultural program together. As a result, they gathered married immigrant women in and out of their village to establish the peace room in 2008, and then work on the program with the social welfare center's administrative and financial support. It has a similar aspect to public programs such as multicultural centers. On the other hand, it has a similar character to 'self-help group'. As B social welfare center have been working their own multicultural programs since 2016, the support for the peace room has been discontinued.

The peace room is open on Tuesdays, and its programs consist of classes, communal meals, and other activities in this order. Class starts at 11:00 am and participants have lunch at 12:00 pm. After married immigrant women finish washing dishes, it is common to talk about classes and daily life while drinking tea for an hour. In the afternoon classes, a lot of intensive activities can be taught. For example, married immigrant women can receive kimchi or Korean soybean paste from kitchen or gardens. During this time, they can share clothes or children's toys, which are donated by cathedrals or individuals. They can visit the married immigrant women's farm and distribute the harvests, such as onions and potatoes. Table 1 shows a daily schedule of programs.

Researchers collected data by observing the peace room's classes from March to June 2016. We visited the peace room every week and collected data by participatory observation, individual and group interview. When it was difficult to visit due to the researcher's personal affair, a research assistant with field research experience conducted three observations.

Table 1. Daily schedule

Curriculum (11am-12pm)	Communal Meal (12-13pm)	Other activities (13pm-)
Making Korean soy sauce	Curry rice	sharing used clothes
entrance ceremony	Vietnamese spring rolls & noodles	
Visiting D community hall	Curry rice, pancake, white Kimchi, rice wine & beverage, fruits	Social welfare office paid all Singing contests
Making crafts with old stamps 1	black-bean-sauce noodles	exhibition
Video recording by KTV	BỘT BÁNH XÈO (Vietnamese festival food)	30th Anniversary of wedding
Cherry-blossom trip	Gimbap (Korean rolls)	
Group interview	Bibimbap, rice cake	rummage sale of used clothes
holiday		
Jang-Mul	black-bean-sauce noodles	
Making natural soap		
Teacher's day	Vietnamese noodles	Dutch payment
Visiting to Gumi		Su paid by herself
Making crafts with old stamps 2	Bibim noodle	exhibition
Making scrub brush	Soy noodles	Collecting mugwort
Studying English	Jab-chaе rice	
Studying English	Soy noodles	Harvesting onions in D's farm
Visiting J community hall	Chicken soup, pancake, rice wine & beverage	Social welfare office paid all Collecting potatoes in F's farm
Studying English	Stir-fry of chicken	Collecting potatoes in D's farm
Closing ceremony & sweeping day	Curry rice	
Party at cafeteria	Duck & pork belly	Su paid by herself Karaoke bar

Complexity of position and adaptation problems of married immigrant women

Women who participated in the peace room have grown up in different environments and have lived in Korean society with various stories. Multicultural women are never homogeneous, and have a variety of personality and reality. Even if they are from the same nationality, there are significant individual differences such as childhood (raised) background, education level, health, personality, and relationship with family-in-law. Therefore, in order to fully understand the adaptation issues of those women, it is necessary to consider the position of each one of them in the Korean society and the socio-cultural practices.

Table 2. Participants' information

	Entrance year	Ethnic origin	Children	Occupation of husband	Matchmaking	Attendance	Reason to participate
A	2008	Vietnam	2boys	Agriculture	agency	50%	hearsay
B	2012	Vietnam	1boy 1girl	Agriculture	agency	50%	A's Introduction (3.3.2015)
C	2011	Vietnam	1boy	Agriculture	agency	60%	B's Introduction (5.2.2015)
D	2008	Vietnam	1boy	Agriculture	agency	occasion	Same village
E	2008	Vietnam	1boy 1girl	Agriculture	Agency	Occasion	Same village
F	2007	Cambodia	1girl	Agriculture	agency	occasion	Same village
G	2007	Philippine	1boy	Agriculture	Unification church	occasion	Same village
H	2008	Cambodia	none	Jobless	agency	50%	F's Introduction
I	1996	Japan	1boy 4girls	Jobless	Unification church	90%	Herself
J	1995	Vietnam	1boy 1girl	Business	agency	100%	Meeting in a cathedral (3.2012)
K	2010	Vietnam	1girl	Business	agency	100%	Friend's introduction (3.2012)
L	2008	Vietnam	1girl	Civil servant	agency	70%	Friend's introduction (3.2012)
M	2014	Vietnam	1girl	Business	agency	70%	K's introduction (3.15.2012)
N	2000	Vietnam	1boy 1girl	equipment operator	agency	40%	J's introduction (3.15.2012)

Table 2 is the overview of multicultural women who participated in the first semester of 2016 class. This gathering includes a large number of women from Vietnam, but they come from a variety of nationalities, including Cambodia, Philippine and Japan. It is always open to any participant woman regardless of the country of origin or the year of entry. It is different from the 'self-help group' organized by the country of origin.

Strategies and Cultural Practices to Live in Patriarchal Rural Society

The social pressures and expected role behaviors imposed on married immigrant women in multicultural family in Korean rural societies can be summarized as "obeying the husband and honoring the elders of the family". It is the same in the peace room.

I strongly recommend married immigrant women to behave good in family-in-law and obey husband. I cannot help but emphasize this, otherwise they will be the one who suffer (Su, April 12).

It is not appropriate, if the peace room is understood as being absorbed in the patriarchal dominant ideology of Korean rural society. We should consider a special situation that the person in charge of the peace room is handicapped couple and that married immigrant women are in the weakest position in the society. Considering their social situations, it is hard for them to assert or act on their rights. Although the peace room repeatedly emphasized honor to parents-in-law and obedience to husband, it also asked those women to be more active and aggressive in dealing with individual problems or situations.

Mrs. 00 told me that she was hit once, so I told her to report to the police. I kept telling her never to bear such a thing like that (Su, June 14).

Since my husband is a public official, my mother-in-law is holding the household economy. She does not give money to me. She says, "If I give you the money, you will leave the family." So I go work at the mushroom factory or farming house (L, April 12).

When a husband's violence occurs, Su advises active coping strategies such as "reporting to the police." And when a Korean mother-in-law puts severe economic constraints for the control of daughters-in-law, Su recommends married immigrant woman to build their own ability to have economic power. Main curriculum of the peace room is to visit community hall and senior center twice a semester, fourth a year. The purpose of this program is to provide an opportunity to learn the value and language of the mainstream group and use it as a tool of persuasion in everyday life. Filial piety by sharing the food with the seniors who live alone or visiting the town hall to talk to the elderly people, and the performances for married immigrant women's children is combined with the solidarity of local community, the welfare of the elderly people, and the awareness of married immigrant women. In other words, married immigrant women's activities are emerging as cultural practice with new meanings. This practice has been an important opportunity for positively changing the existence of those women and the peace room in villages and local communities.

The elderly people remind me of my grandparents in Vietnam. I believe that my children will take good care of me with love when I get old as I do it the same way to elderly people. I felt good because they enjoyed the food I made (A, June 14).

Married immigrant women can feel that they are getting better during involvement of activities that they mentioned. Their scope of activities are gradually expanding from one village hall to currently two town halls and two elderly halls. In this way, the peace room is creating interactions with local communities and emotional sympathy. In addition, as married immigrant women have served food in the village where they live, their own presence has been emerging. It is dangerous to misunderstand the change of perception of village residents as a result of program such as visits to the elderly halls. Apart from the activities of the peace room, it has been several years since married immigrant women entered the village, and it is possible to accompany natural change of village residents' perception. Nevertheless, it is clear that married immigrant women have the opportunity to show their presence inside and outside the village through these activities. Married immigrant women may have confidence to contribute to their village or community. These activities are noteworthy in terms of cultural studies, because it is related to the recovery of self-esteem and positive self-identity.

Conclusion

As a cultural experiment in microscopic and everyday unit, this study is to investigate the case of cultural practices in a community, the responses of the rural society to the multicultural coexistence, and thus the possibility of formation of new social order. The research does not focus on how married immigrant women were absorbed into a single culture, but how they shared and resolved the situation and conflicts encountered in daily life of individuals. Ten years history of the peace room has been marked by social conflict, exclusion, and prejudice in the relation of external groups. Cultural practice, which has been emphasized in this process, was not based on overturning or resistance to existing values or order. But rather, adaptation strategy sought by the peace room is a way of positively accepting and utilizing such values as 'filial piety' and 'traditional virtue' which were emphasized in the rural mainstream society.

However, it is unreasonable to understand those women as passive ones which their actions and practices are utilized by the dominant ideology. It should be taken into account that the disabled couple as the operators of the peace room, and the marriage immigrant women as main participants in the peace room were not in a position to positively express their rights in reality. However rather, they have sought cooperation with the villages and local communities through cultural practices such as accepting and utilizing the value and language of existing mainstream society. Typical activities are as follows: visiting community centers, serving food to the elderly, or playing with them. Thus these activities were forming exchanges and emotional bonds with the villages and communities. These cultural practices in daily life have actually led to meaningful changes in villages and communities. For example, attitude of the elderly who refused those women using or visiting the village hall from the beginning has changed to the approval of the existence of married immigrant women. It is also worth of taking note of cultural asset that married immigrant women have self-esteem and positive identity formation.

References

- Han, G. (2006). Family life and cultural encounter of foreign wives in rural area. *Journal of the Korean Society for Cultural Anthropology*, 39(1), 195-219.
- Joongang SUNDAY <http://news Joins.com/article/21454659> retrieved from 9 April 2017
- Jung, S. (2016). *Life of Multiculture and Married Woman in Region*. Seoul: Minsokwon.
- Kim, M. (2014). conflicts on daughter-in-law and mother-in-law in Rural Married Women. *Unpublished Dissertation in Hanseo University*.
- Kim, T. (2012). *Life and Adaptation of Married Woman*. Paju: Kyungin Publishing.
- Lee, J. (2016). The strategy of women who are married into multicultural families to get adapted to rural community and the reaction of their village community. *The Folklore Studies*, 33, 43-83.
- Oh, Y., Park, M., & Jang, Y. (2014). A Study on Experience of Filial Duty by Chinese Marriage Migrant Women. *Journal of North-East Asian Cultures*, 40, 281-303.
- Yoon, H. (2005). Conflicts and Adjustments of Foreign Wives Married to Korean Men: Filipina Wives in Rural Korea. *Journal of Local History and Culture*, 8(2), 299-339.

Massive Open Online Courses: Inspiration For Redesigning An Undergraduate Introductory Course In Mathematics

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Abstract

This paper deals with a possible redesign of the course *Mathematics for Economists*, a compulsory undergraduate introductory mathematics course taught at the University of Economics, Prague. As an inspiration for this redesign, we have chosen massive open online courses, due to their recent popularity and much discussion of their impact on traditional university teaching process. Although there are many vital aspect that have to be taken into account for a successful and meaningful redesign, in this paper we focus on the students' perspective – their learning experience, expectations and other aspects. The data needed for this research were collected using in-class observation during recitation sessions of the course by the author of this paper, a teaching assistant for the course, and using an anonymous paper survey conducted by distributing questionnaires to students enrolled in three of total twenty-nine recitation groups of the course in summer term 2017/2018. The main findings show that students spend, on average, 4.8 hours per week on the course, not including preparation for the interim test, final test, and oral exam, which amounts to additional 42 hours, on average; students attend recitations far more often than lectures; and they value most the interaction with teacher's assistant over particular problems encountered during their study, substantially more than revision of theory or methods used to solve problems. These basic findings, as well as results of an experiment of Massachusetts Institute of Technology allowing students to replace a traditional university course by its MOOC version, has lead us to a proposal of new course design. The core characteristics of this proposal are the usage of pre-recorded lectures and tutorials, compulsory online homework and recitations dedicated mostly to addressing particular difficulties encountered by students while engaging the former course components.

Brief History Of Moocs

The term *massive open online course* (MOOC) was probably first used [Cormier, 2008] by David Cormier from University of Prince Edward Island in a Skype conversation with George Siemens, one of the authors of the course *Connectivism and Connective Knowledge*. This course is now considered as one of the first cMOOCs, i.e. MOOCs based on the principles of connectivist pedagogy. Our interest, nevertheless, is in the so called xMOOCs, whose structure more closely follows the structure of traditional university courses – the syllabus of the course is given in advance, sometimes including deadlines for assignments and tests, and the backbone of the course usually consists of recorded lectures, followed by individual assignments, sometimes group activities, and moderated discussions.

Today, there are many providers of MOOCs, some commercial, other non-profit, some founded by universities, other by private companies established primarily for that purpose. Two of the most notable providers are edX.org, created in 2012 by Massachusetts Institute of Technology and Harvard University, and Coursera, founded also in 2012 by Stanford University professors Andrew Ng and Daphne Koller.

Since we are interested primarily in the possible use of MOOC principles and tools in redesigning traditional university courses, let us now focus more on edX.org, a platform founded and closely collaborating with universities from all over the world. As this day, edX.org offers over 2000 different courses in subjects as varied as architecture, computer science, ethics, food and nutrition, chemistry, law or physics, and provided by a growing number of institutional partners including MIT, Harvard University, Caltech, ETH Zurich or Kyoto University; as of today, it has now more than 14 million students from all over the world, with over 52 million individual enrollments across the courses it offers.

Introduction

A traditional undergraduate course in mathematics usually consists of two basic components – lectures and recitations. During the lectures, attended by a large number of students in one group, the lecturer presents the topic, explains theory, gives basic examples and solves a few typical problems related to that topic; students are usually expected to follow the lecture completely without or with only limited interaction between them and the lecturer. The lecture is then followed by recitations; students are divided into a larger number of smaller recitation groups and engage the topic being studied individually or in small groups under the observation and in interaction with teacher's assistant, solving problems, discussing challenging topics, recalling the theory they learned during the lecture.

The course *Mathematics for Economists* has been taught this way for more than 10 years. It is a one-semester undergraduate course offered to students of University of Economics in Prague both during the winter and summer

term. As a compulsory subject for various study programs, it is attended every year by a large number of students from five different faculties of the university. In the summer semester 2017/2018, 733 students were enrolled in the course; they were divided into 7 lecture groups and 29 recitation groups, so that every lecture group consisted of approximately 100 and every recitation group of approximately 25 students. Students are expected to spend 26+26 hours per semester attending lectures and recitations, 26+26 hours preparing for them, 13+13 hours preparing for the interim and final test and 26 hours preparing for the final oral exam; the expected workload makes this course worth 6 ECTS credits. The course covers basic topics in undergraduate mathematics – linear algebra and matrices, convergence, differentiation, integration, functions of two variables and differential equations. Apart from the lectures and recitations, another study resource is available to students – the textbook *Mathematics for University of Economics* [Klûfa, 2016], written especially for the course.

The main topic of this paper is the question whether and how such a course could be redesigned in the light of the experience gathered from courses run on MOOC platforms like edX.org. This, of course, is in no way a small matter, as various aspects play a vital role in any possible new design of a compulsory university course – material and personal capacities of the department providing such a course, different requirements on the content of the course from all the faculties to whose students the course is offered, the role of the course in different accredited study programs et cetera. The scope of this paper does not allow us to address all the perspectives of this task; we have decided to focus here on the students' perspective – their learning experience, expectations, and the amount of knowledge attained.

Methodology

During the summer term 2017/2018, the author of this paper was a teacher's assistant for three recitation groups of the course *Mathematics for Economists*. Apart from occasional in-class observation during the recitations, the data for this paper were collected using an anonymous paper survey. In the twelfth of the thirteen weeks of the semester, the students present at the recitations (38 out of total 75 enrolled in the three recitation groups) were asked to fill out survey questionnaires. The questions and possible answer choices are presented below.

1. What percentage of the lectures have you attended to? (100-80%, 79-60%, 56-40%, 39-20%, 19-0%)
2. What percentage of the recitations have you attended to? (100-80%, 79-60%, 56-40%, 39-20%, 19-0%)
3. Have you or do you intend to pay a private tutor to help you study for this course? (yes, no)
4. With respect to your study program, do you understand why this course is compulsory for you? (yes, rather yes, don't know, rather no, no)
5. With respect to your study program, do you understand why you are to study the main topics of this course, i.e. vectors, matrices, derivatives, integrals, differential equations? (yes, rather yes, don't know, rather no, no)
6. How many hours per week on average have you spent preparing for the course during the semester? (open question)
7. How many hours have you spent preparing for the interim test? (open question)
8. How many hours do you expect to spend preparing for the final test and oral exam? (open question)
9. Do you find yourself to struggle with understanding the basic methods used to solve problems? (yes, rather yes, don't know, rather no, no)
10. Do you find yourself to struggle with solving problems on your own? (yes, rather yes, don't know, rather no, no)
11. Do you find yourself to struggle with understanding the theory? (yes, rather yes, don't know, rather no, no)
12. If parts of the lectures were video-recorded, would you use as a study resource the parts explaining the theory and basic notions? (yes, rather yes, don't know, rather no, no)
13. If parts of the lectures were video-recorded, would you use as a study resource the parts explaining how to solve typical problems? (yes, rather yes, don't know, rather no, no)
14. If parts of the recitation were video-recorded, would you use as a study resource the parts explaining how to solve typical problems? (yes, rather yes, don't know, rather no, no)
15. If parts of the lectures were video-recorded, would you use as a study resource the parts explaining how to solve untypical problems (unusual methods and "tricks")? (yes, rather yes, don't know, rather no, no)
16. If it were possible to spend an hour with your teacher's assistant preparing for the final exam, would you like to revise the theory? (yes, rather yes, don't know, rather no, no)
17. If it were possible to spend an hour with your teacher's assistant preparing for the final exam, would you like to revise the basic methods used to solve problems? (yes, rather yes, don't know, rather no, no)
18. If it were possible to spend an hour with your teacher's assistant preparing for the final exam, would you like to consult particular difficulties you have encountered while studying the theory? (yes, rather yes, don't know, rather no, no)
19. If it were possible to spend an hour with your teacher's assistant preparing for the final exam, would you

like to consult particular difficulties you have encountered while solving problems? (yes, rather yes, don't know, rather no, no)

The questionnaire was designed to gather data not only for this paper, but for other research as well. That is why we will not include all of the questions in our analysis; nevertheless, for the sake of completeness, we present the questionnaire as a whole.

Data Analysis And Summary

The data gathered from the questionnaires show the following:

- Out of 38 students, 8 payed or intended to pay a private tutor to help them study for the course.
- On average, students spent 1.8 hours per week preparing for the course during the semester.
- On average, students spent 11.7 hours preparing for the interim test.
- On average, students expected to spend 30.3 hours preparing for the final test and oral exam.

During the semester, students are expected to spend 1.5 hours per week at lectures and 1.5 hours per week at recitations. Thus, spending 1.8 hours per week preparing for the course at home makes home-study more time-consuming activity then both attending lectures and recitations.

Figure 1 and Figure 2 summarize students attendance of lectures and recitations.

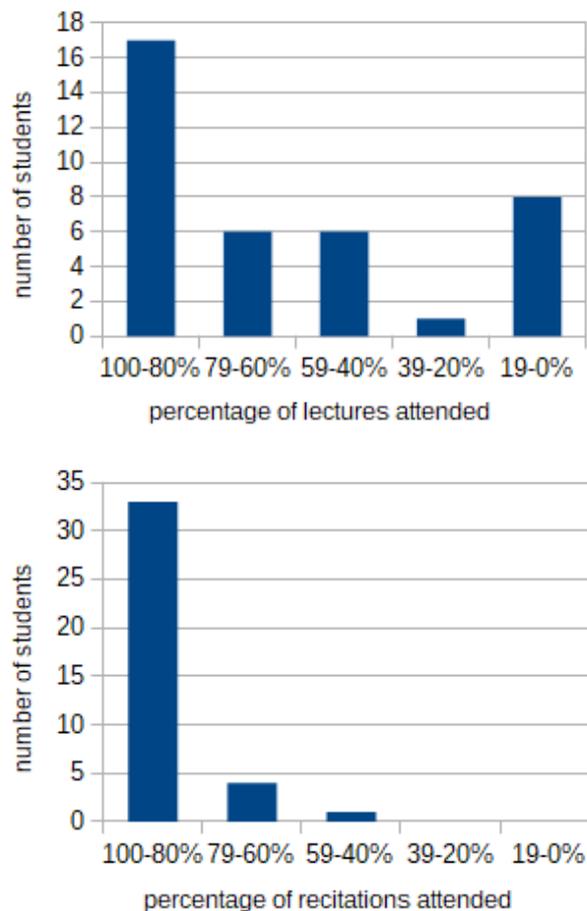


Figure 2

This data suggest that students clearly prefer recitations to lectures, yet it has to be mentioned that the data were collected at a recitation session. While data collected at a lecture might give a different picture, it is a general experience (although not supported by any measurement) that students of the course tend to attend recitations more often then lectures. Preference of recitations to lectures could be explained by the fact that students value direct interaction with teacher's assistant during recitations and the possibility to engage the topic being studied and related problems on their own, but with teacher's assistant present to help in real time. This explanation is supported by the students answers to the last four question in the survey. Figure 3, presenting the distribution of answers, clearly shows that students prefer consulting particular difficulties they have encountered while studying the theory

(consult theory column) or while solving problems (consult problems column) to revising theory (revise theory column) or methods used to solve problems (revise problems column).

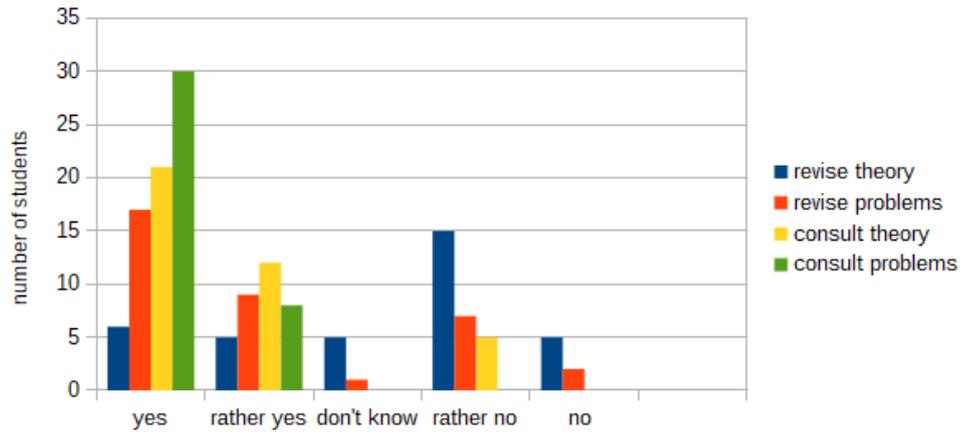


Figure 3

As can be easily seen from Figure 3, students are more interested in teacher's assistant's help with problems than with theory.

The last piece of data relevant to our research interest, Figure 4, summarizes students' intentions to use potential video-recorded lectures as a study resource. In questions 12 to 15 students were asked whether they would use video-recorded parts of lectures explaining theory and basic notion (lecture theory column), explaining how to solve typical problems (lecture problems column), or recorded parts of recitations explaining how to solve typical (recitations typical column) or untypical problems (recitations untypical column).

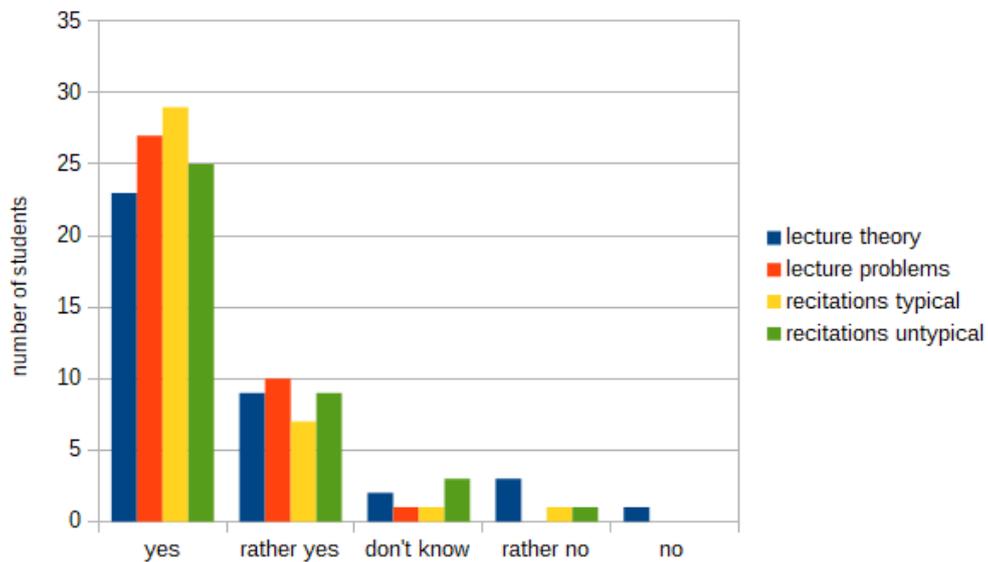


Figure 4

Once more, Figure 4 shows students inclination to focus in their preparation for the final exam more on problems than on theory, yet this preference is not as much decided as in the previous set of questions; nevertheless, the rather high number (20 out of 38) of students who are not interested in revising theory with teacher's assistant is not paralleled here, the number of students who would not use video-recorded lectures explaining theory is very low.

An Experiment: Mooc For On-Campus Students

During the fall semester 2016, Massachusetts Institute of Technology (MIT) has decided to conduct an experiment – MIT students were allowed to enroll in the edX version of *Circuits and Electronics* course instead of the

traditional on-campus version of the same course; the outcomes of the experiment are summarized in a report [Marshall, 2017]. Although the key components of MOOC courses (video lectures, online discussions and quizzes, interactive learning environment) have been used in university education for decades, this was arguably the first time when resident university students could finish a compulsory course completely on-line, without ever meeting instructor of the course or teacher's assistant. This makes this experiment considerably different from other approaches to usage of communication and audio-visual technologies in education, such as the concept of flipped classroom, in which students are typically supposed to watch recorded lectures on their time outside of classroom and the work usually considered homework is performed in class under supervision and in interaction with teacher's assistant.

For our paper, the following findings of the report [Marshall, 2017] are of interest – the distribution of grades of students enrolled in the MOOC version of the course was comparable to that of students attending traditional lectures and recitations; although students of the MOOC version were encouraged to come to on-campus office hours, only few used that opportunity; online homework was seen as useful by students, since it allowed immediate feedback; the MOOC version of the course was rated by students as less stressful.

Redesigning The Course

As we have seen, a typical student of *Mathematics for Economists* spends, or is supposed to spend, 3 hours per week in lectures and recitations, and 1.8 hours by studying out of classroom; thus, in total 4.8 hours per week are dedicated to the course. As from the students' perspective it is clearly not desirable to increase the amount of time spent on the course, let us now try to envisage a possible redesign of the course that does not exceed the limit of 4.8 hours of expected studying per week. This new design should also take into account the students' preference to attend recitations rather than lectures, the fact that they are prepared to use video-recorded lectures in their out of classroom study, and the clear tendency to value more the possibility to consult particular difficulties they have encountered than presentation and revision of the material to be mastered.

It seems reasonable to use pre-recorded lectures, as studies show students find them more valuable than live lectures [Cardall, Krupat, Ulrich, 2008]. Experience shows [Kajimoto, 2016] that pre-recorded lectures tend to be less repetitive than traditional face-to-face lectures and therefore it takes less time to cover the same amount of material. Let us thus suppose that instead of 1.5 hours of traditional lecture the average amount of time for pre-recorded lecture material would be 1 hour per week. Pre-recording would also allow for the possibility of slightly prolonging or shortening the lecture depending on the topic being covered, an advantage to traditional lecture where the amount of time available is given by the schedule.

From the author's experience as teacher's assistant, about one third of time of a recitation session is spent in frontal delivery of content to students (usually solving typical problems and mentioning some tricks and untypical approaches), in the rest of the session, the students are working on problems themselves under teacher's assistant's supervision. The first part, frontal context delivery, could again be pre-recorded. In total, pre-recorded content would thus comprise of approximately 1.5 hours of audio-visual material – 1 hour of lecture and 0.5 hour of recitation/tutorial.

Thus, instead of attending lectures and recitations, students would be expected to watch this material out of class. Recitations session could then be fully dedicated to teacher-student interaction which is valued most. It does not seem reasonable to try to avoid recitations completely or to opt for shorter recitations; both our data and other studies [Griffiths, Mulhern, Spies, 2015] show high perceived value of interaction with lecturers or teacher's assistants. But, as we have seen, students are most interested in consulting particular difficulties they have encountered in their own preparation for the course, so it would indeed be helpful if they came to recitations after they first tried to solve some problems of their own. This could be arranged for by including some amount of online homework after the pre-recorded content. The homework should test basic understanding of theory and methods of problem solution, so that students would have a chance to identify fundamental misunderstanding or gaps in understanding of the concepts and methods they are expected to master that week and thus potentially come to recitation session with particular questions and challenging topics. Based again on in-class observation and experience, the expected time spent on such homework assignments should be between 0.5 and 1 hour, depending on the student's mastery of the subject.

This takes us to the following redesign proposal; a typical weekly workload should comprise of

- approximately 1 hour of pre-recorded lecture focused mainly on theory and concept mastery
- approximately 0.5 hour of pre-recorded recitation/tutorial focused on problem solutions
- online homework, between 0.5 and 1 hour, depending on student's mastery of the subject
- in-class recitation session of 1.5 hour
- possible self-study and office hours, depending on the student's consideration and needs

The total time demands of the first four points in our proposal are between 3.5 and 4 hours per week; having in mind that students of *Mathematics for Economists* nowadays spend 4.8 hours on average on the course, this still

leaves 0.8–1.3 hours for self-study and office hours while not increasing the amount of time students have to designate for their study. It might even be expected that students will not even need that much time for their own preparation, as the recitations are to be expected more effective, since the new course design leads the students to come to recitations more prepared than before.

As we have also already seen, students of *Mathematics for Economists* spend 42 hours on average in total preparing for the interim test, final test and oral exam. The pre-recorded lectures and recitations/tutorials are one more study resource the students would gladly use, as our survey clearly show. It can be argued that added value of such a material is the fact that it is the very same material from which the students learned the subject for the first time, thus making their recalling easier and more effective than in the case of real-time face-to-face lectures to which, of course, the students cannot return and thus rely solely on their own notes.

Another advantage from the perspective of students is the fact that the new design demands only 1.5 hour of in-class time per week, instead of 3 hours of the traditional design (1.5 hour of lecture and 1.5 hour of recitation). This makes it easier to fit the course into their schedule and allows more time for facultative courses and extracurricular activities.

The inspiration for this design by MOOCs is clear; it can even be said that the first three components of our course design (pre-recorded videos and online homeworks) could stand alone as a MOOC. The only crucial aspect of a MOOC that is missing is online discussion forum. There is clearly no need for that, as instead of online discussions there are weekly recitation sessions. It should also be noted that our concept does not really fit under the concept of a flipped classroom, as in a typical flipped classroom some of the content is delivered in-class, whereas in our design, all the content is already present in the pre-recorded lectures and tutorials and recitations serve more as group office hours, being dedicated primarily to addressing particular problems students have already encountered during their study for the course.

Conclusions

In this paper, we have tried to suggest a redesign of the course *Mathematics for Economists* based on the experience of usage of MOOCs in traditional university setting and on the data gathered from students of the course mentioned. The main guideline for this redesign was the perspective of students, thus all the other vital perspectives, that of the department providing the course, of demands of the faculties to whose students the course is offered, or of various study programs accreditations, were set aside. The resulted course design comprises of three core elements, duration given per week – about 1.5 hour of pre-recorded lecture and tutorial material, 0.5–1 hour of online homework, and 1.5 hour of in-class recitations.

Various possibilities for further research are clearly at hand. First of all, it would be necessary to take into account the other perspectives mentioned in the previous paragraph before a project of new course design could move to another phase. The next logical phase would be that of testing the new design, either some components of it separately, as add-ons to a traditional course, or as a whole, for a selected group of students. In this phase, possibilities for research would be numerous, yet as for now, this stage still lies, if it comes to that point at all, in a distant future.

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References

- Cardall, S. & Krupat, E. & Ulrich, M. (2008). Live lecture versus video-recorded lecture: are students voting with their feet?. *Academic medicine: Journal of the Association of American Medical Colleges*, 83(12), 1174-8.
- Cormier, D. (2008). The CCK08 MOOC – Connectivism course, 1/4 way [On-line]. Available: <http://davecormier.com/edb/2008/10/02/the-cck08-mooc-connectivism-course-14-way/>
- Griffiths, R. & Mulhern, Ch. & Spies, R. (2015). Adopting MOOCs on Campus: A Collaborative Effort to Test MOOCs on Campuses of the University System of Maryland. *Journal of Asynchronous Learning Network*, 19(2).
- Kajimoto, M. (2016). Developing news literacy curricula in the age of social media in Hong Kong, Vietnam and Myanmar. *Journalism Education*, 5(1), 136-154.
- Klůfa, Jindřich (2016). *Matematika pro Vysokou školu ekonomickou*. Praha: Ekopress, s.r.o.
- Marshall, A. E. (2017). A Preliminary Assessment of an MIT Campus Experiment with an edX Online Course: The Pilot of 6.S064 Circuits and Electronics [On-line]. Available: <https://openlearning.mit.edu/sites/default/files/PreliminaryAssessmentofMITonEdX.pdf>

Masters Bring Business Benefits – Proved By Finnish Managers

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Abstract

In this empirical research paper, I seek to answer the question: *How does working life benefit from UAS master's theses?* My goal is to demonstrate how master's students of the Degree Programme in International Business Management (IBMA) at Haaga-Helia University of Applied Sciences (UAS) in Finland bring business benefits to organizations with their master's theses as work development projects. For this purpose, I collected and analyzed qualitative data from 91 organizations during the period of 2007-2016. This qualitative, thematic analysis shows that organizations benefit from UAS master's theses. The benefits proved by Finnish managers are very tangible ones, such as internationalization strategies, digital marketing plans, market research and analysis, training programs, communication plans, and so on. The empirical contribution of this paper is significant to employers of UAS master's graduates, UAS business educators, and educational policy makers. The findings increase the awareness and competitiveness of UAS master's graduates in the job market. Furthermore, they show how and why business and academic collaboration is critical.

Keywords: *Master's thesis, business benefits, business and academic collaboration, university of applied sciences*

Introduction

In the knowledge economy, the traditional university faces new challenges and opportunities because it cannot be considered anymore as the sole contributor to knowledge creation. 'For universities the question is not only how to create usable research knowledge or find the needed knowledge, but also how to become a partner, act in dynamic innovation networks, combine knowledge from several sources and co-create it with other organizations to contribute to industry innovation and society as a whole' (Laine et al. 2008, 9). Nowadays knowledge is perceived more broadly, i.e., epistemology of knowledge is extended to practical, empirical knowledge. While traditional universities play an important part in basic research as producers of theoretical knowledge, universities of applied sciences (UAS), by focusing on applied research, produce knowledge that brings practical benefits for businesses.

The topic of academic and business collaboration is not new, but it has become more important as the benefits of collaborative, social learning and knowing become imperative. Wenger (2005, 214) argues that communities of practice as living contexts are places not only for knowledge acquisition, but also for knowledge creation. Tulkki's view is that 'Universities of applied sciences are in a key position in guiding and enriching the flows of knowledge ... (they) act as the testers and forerunners of learning wisdom' (Tulkki 2008, in Laine et al. 2008, 124-5). The master's thesis in a UAS is an excellent example of social, collaborative learning in practice in a rich learning context, in an ecosystem where business problems are solved together (Jakubik 2017).

Since August 2005 in the Finnish higher education system, both traditional universities and universities of applied sciences (UAS) provide master's degrees. However, Ojala (2017) in her doctoral dissertation argues, 'Compared to the master's degree from traditional universities graduates of the UAS master's degree believed that the degree generates more competence than competitiveness.' Ojala surveyed UAS master's graduates and employers. Based on a survey of 72 employers in 2012 Ojala concludes, 'Employers indicated that the increased value of the UAS master's degree was its focus on work and practice, as well as increased specialist expertise.' She adds, 'Employers ... were satisfied with how the education responds to the requirements of working life.' My objective in this paper is to verify her cross-sectional (2012) results with an extended, longitudinal, 10-year qualitative data analyses based on feedback from 91 Finnish managers, employers of UAS master's graduates.

This research is needed because of the different status and competitiveness of master's degrees from traditional universities and universities of applied sciences on the labor market and because there is a need for more clarification of the business benefits for employers of the UAS master's degree and thesis. Furthermore, I strongly believe that there is a need for making the UAS master's degree better known to employers because it would increase the competitiveness of UAS master's graduates. Therefore, in this paper, I focus on the business contributions of the UAS master's theses. I seek to answer the question: *How does working life benefit from UAS master's theses?*

The paper has seven sections, including an introduction, appendices, and references. After presenting the need for this study in the introduction, I describe the goal and process of the master's thesis as part of the curriculum of the Master's Degree Programme in International Business Management (IBMA) of Haaga-Helia UAS, Helsinki, Finland. Next, I focus on the thesis assessment criteria. Then, I present my data collection and research approach. Next, I demonstrate the findings of the 91 Finnish managers' assessment of business benefits brought by UAS master's students. The contributions of the work development project as a thesis is based on ten years of feedback from employers. In the conclusions, I answer the research questions, highlight the business and educational implications of my longitudinal, qualitative research, indicate its limitations, and suggest future research areas. Finally, in the appendices, I present a summary of the immediate (table 1) and future (table 2) business benefits of the UAS master's thesis sought by Finnish managers.

The Goal And Process Of The Master's Thesis

The Master's Degree Programme in International Business Management (IBMA) of Haaga-Helia UAS in Helsinki started in autumn 2007. According to the Students' Guide (2018), 'The goal of IBMA is to develop students' international business management competences through variety of work development methods and tools, international business management courses, and through tutoring them in an applied research and work development project as their master's thesis.' Working on the thesis starts from the very beginning of studies. Students are expected to act as facilitators and leaders of change by applying in practice their international business knowledge that will make them and their organizations competitive players in international business.

The three main objectives of the IBMA Programme are as follows:

1. to satisfy the increased demand of organizations for employees with practical and current international business knowledge and competencies
2. to provide a career opportunity for bachelor's graduates by continuing and upgrading their education in international business management
3. to encourage students to apply their international business management skills and knowledge in their everyday work in order to create and extract value for their organizations' (Students' Guide 2018).

The master's thesis is a 30ECTS (810 hours) work development project. Its goal is 'to develop and demonstrate the ability to apply the selected research strategies and methods in the identification and solution of an authentic, work related, international business management problem. Furthermore, the objectives of the thesis are to develop international business management skills, competences, and qualities of students that would make them competitive in the global job market' (Master's Thesis 2018).

In this master's programme the emphasis is on cooperation with working life. 'Learning during the programme happens by addressing international business management problems in case studies, research, and in the master's degree thesis that is a work development project with international business dimensions. The thesis, as an applied research and development project, is a substantial part of the studies to be implemented in close collaboration between students, their workplaces and Haaga-Helia UAS' (Students' Guide 2018).

The master's thesis process in the IBMA has four phases: planning, implementing, assessing and developing (Master's Thesis Process 2018). In this paper, I focus on the assessment phase of the thesis process because my goal is to demonstrate how the master's brings business benefits to the organizations involved. This is the phase when employers, i.e. Finnish managers, are involved in the assessment. 'Here employers assess the learning of the student during the development project. They also indicate how the organization has benefitted from the thesis, what was implemented in practice, and what the possible long-term impact and value are for the organization' (Jakubik 2017, 55). Next, I will present the assessment criteria of the master's thesis.

Thesis Assessment Criteria

As its web-site states, 'The thesis will be assessed by the HAAGA-HELIA thesis tutor, the inspector, and by the company contact person for the work development project. The thesis assessment form and criteria are available in Moodle and MyNet. A thesis grade will be given after the maturity exam is completed. The self-assessment of learning does not have an impact on the grade and it will be used for developing the thesis process' (Master's Thesis 2018). This three-party assessment of the UAS master's thesis is necessary because in this way both academic and business contributions are evaluated. Work life assessment by Finnish managers ascertains the business benefits for the employer.

The same assessment form is used for master's programmes in English at Haaga-Helia. The six assessment criteria are as follows:

1. topic and objectives (significance and currency; objective and scope; work life orientation)

2. conceptual framework/theory (literature review; conceptual framework; definition of concepts)
3. methods (planning and implementing; evaluating outcomes)
4. outcomes (correspondence between objectives and outcomes; value contribution)
5. reporting (structure consistency; clarity and readability)
6. project management (planning; implementation; analysis and reflections)

Each criteria is assessed on a scale from satisfactory (1), through good (3), to excellent (5). To help the assessment there are statements developed for each criteria and each scale. For example, criterion 1 is assessed as excellent when: ‘The topic involves innovative perspectives and it is important for the organization. The objective and scope have been defined excellently. The topic is strongly related to working life development.’ Criterion 4 is weighted double and it is assessed as excellent when: ‘The outcomes correspond to the objectives excellently. The value contribution of outcomes is excellent. The conclusions are justified excellently. Suggestions for further development are very valuable for the organization.’ This UAS master’s thesis assessment grid is very practical and it has proven to be useful in the assessment process.

In addition to the thesis assessment grid in the IBMA, the work life representative, i.e., the Finnish manager, is asked to fill out a feedback form. Next, I present the content of this form because it is the source of data collected for the purpose of this paper.

Data Collection And Research Approach

Employers of UAS master’s students, i.e., Finnish managers, involved in the thesis assessment process answered the following five questions when they assessed the master’s thesis (figure 1). The bold arrows on figure 1 indicate the focus and scope of this paper.

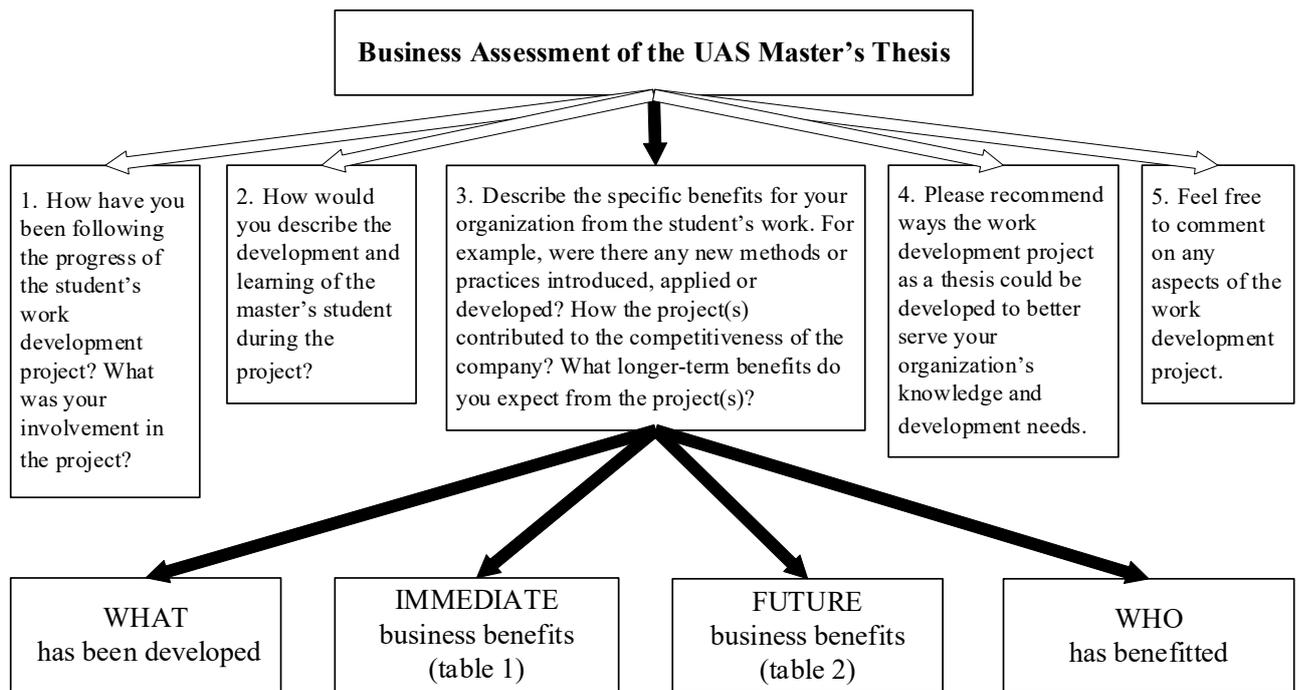


Figure 1: UAS master’s thesis assessment (source: created by the author)

To answer the research question ‘How does working life benefit from UAS master’s theses?’ I analyzed the feedback on question 3 above provided by 91 managers from 2007-2016. The thesis feedback document is a secondary source of data for this paper because the feedback was primarily collected for thesis assessment and not specifically for the purpose of this paper. Following the ethical principles of research, I make sure that none of the organizations or managers could be identified and traced to the feedback they provided.

Feedback was given by different (international, domestic, small, and large) organizations from different business sectors. For example, managers from Accenture, Basware Oyj, Danone Finland Oy, Danske Bank Oyj, Ericsson Finland, Ernst & Young Oy, Fazer Food Services, Hartwall, Hewlet-Packard Oy, InterCall Sweden Ab, KONE Corporation, Nokia Oyj, Reaktor, Trawise Oy, and so on answered the feedback form.

Finnish managers who provided feedback have the following titles and positions: CEO, CFO, Director of Learning & Development, Global HR Line Manager, Head of Product Development, Information Manager, Managing Director, Process Development Leader, Program Manager, Sales and Customer Service Manager, Sales Manager Finland, Senior Account Manager, Senior Executive, Senior Manager People Advisory Services, Technical Director, and so on.

I applied the thematic analysis method for analyzing the feedback answers to question 3 above, because it is the most common, generic method when dealing with unstructured qualitative data. ‘The essential purpose of this approach is to search for themes, or patterns, that occur across a data set’ (Saunders, Lewis and Thornhill 2016, 579). According to Saunders et al. (2016) thematic analysis helps in the following areas:

1. to comprehend often large and disparate amounts of qualitative data
2. to integrate related data drawn from different transcripts and notes
3. to identify key themes or patterns from a data set for further exploration
4. to produce a thematic description of these data, and or
5. to develop and test explanations and theories based on apparent thematic patterns or relationships
6. to draw and verify conclusions (ibid.: 579).

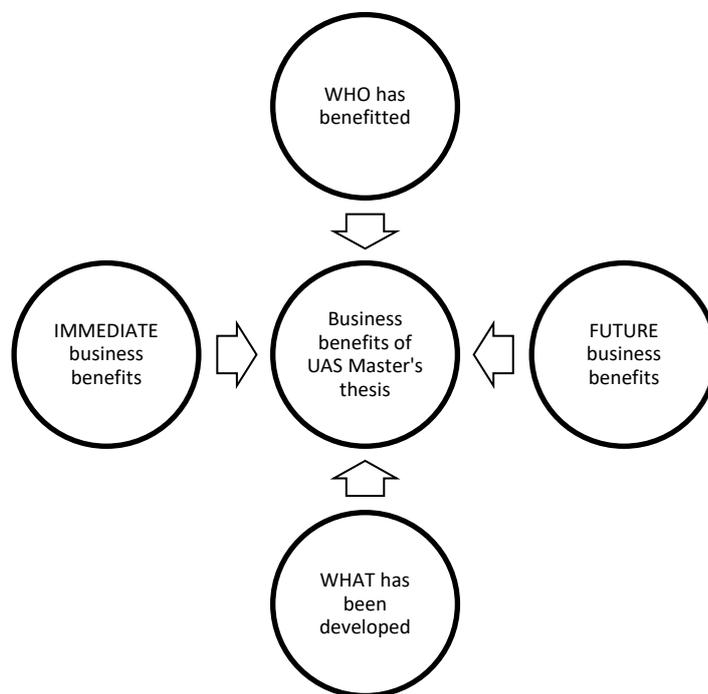


Figure 2: Four themes of the benefit analysis (source: created by the author)

My purpose in this paper is to produce a thematic description of the large amount of qualitative data collected over a 10-year period. First, I transcribed all 91 answers and then, I conducted a benefit analysis, based on the four themes identified in Finnish managers’ feedback on the UAS master’s thesis (figure 2).

In brief, I presented here the content of the master’s thesis feedback form (cf. figure 1) answered by Finnish managers. Then, I briefly introduced the profile of the organizations, and the position of the manager who provided the feedback. Further, I argued for the selection of the qualitative data analysis method for thematic analysis. In the next section, based on the four themes identified (cf. figure 2), I will present my findings.

Findings

Here, I present the business benefits of the UAS master’s thesis of the IBMA programme. I show the findings identified from the large data set of my analysis of 10-year qualitative data according to four themes (cf. figure 2).

Theme 1: What has been developed - What product/service has been developed in the master’s theses? What are the specific benefits for the organization?

From the business world feedback, I identified 101 specific benefits provided by the UAS master’s thesis to organizations. They could be grouped in the following way:

market research and market entry: a framework for the expanding of R&D activities to Russia, an internationalization framework, e-learning market potential, evaluating the most effective ways for entering the market, understanding the market and its different segments, a new intensive market study, risk analysis, market research, a market entry study to Russia, researching target markets, a foreign market analysis, a framework for evaluating expansion to new labor markets, SWOT and competitor analyses, an internationalization strategy for start-ups

marketing: marketing and customer support, a marketing strategy, a B2B marketing plan, marketing and branding development, defining the brand identity, a theoretical framework for global marketing campaigns, selecting distribution and promotional channels in marketing campaigns

communication: the change communication process, methods to improve communication, an IT system for reporting, developing business reporting, visualization and communication aids, the documentation of concepts, an overview of social media channels, strategies developed around audience engagement

human resources: training material, information about how personnel think, useful suggestions, questions for development discussions, an implementation plan for career counseling, a spirit of teamwork, respect and empathy, a framework for HR and change management, a framework for motivation, documenting an HR job satisfaction project, new ways of conducting performance reviews, analyzing the commitment of a unit's employees, a proposal for new training programs for salespeople and sales managers, using a new approach

leadership and management: the ten most important leadership features, guidelines for managers without authority, a survey on team leaders' working methods, exploring the difficulties in projects, a model promoting emotional intelligence

organizational change and development: an overview of the business, the current situation, suggestions for improving language courses for immigrants, new methods to develop processes and operations, new business models, creating a scorecard, a scorecard for the company, a strategy plan, up-to-date information, ideas for new digital ways of working, recommendations on how to increase our business value, business modeling tools, the Blue Ocean Strategy framework introduced as a tool, a comprehensive analysis of activities, a value network within the organization

innovation: recognizing intellectual capital, new ideas and knowledge, combining theory and practice, ways of developing knowledge transfer practices, a global study about how people see development

sales and services: information on consumers' buying processes, developing sales opportunities, development opportunities in sales practices, remote selling, workshops for sales teams, tools and ideas on how to change our mindset in sales processes, gathering customer feedback, collecting feedback from guests, factors influencing the service sector and customer satisfaction, conducting a user experience and expectations survey, subsequently analyzing the data, a customer experience survey, a service model, new service developments

collaboration: an implementation plan for partnerships, an outsourcing decision model, an online value proposition, collaboration, information about offshore resources, identifying the important factors in onshore and offshore cooperation, F2F interviews with key account customers, partner relationship management (PRM) theory and practice, a survey of international members' positions at universities and places of business in Finland, a new complaints and feedback process, new and valuable insight about the perception of the unit's internal customers, its role, performance, cooperative approach and ideas for further improvement, experts' views

Theme 2: Immediate business benefits - Have the findings of the master's thesis been implemented/used? What are the immediate benefits and impacts of the master's thesis for the organization?

The benefit analysis resulted in 153 immediate business benefits, which are summarized in table 1 in the appendices. Here, however, I present a few quotations from managers as illustrations.

- 'Benefits for the company are a greater understanding of the needs from the end-user of the CRM system and validating some of the directions already taken for the development of the system.'
- 'The most substantial benefit for the company has probably been the face-to-face interviews with strategic customers' key accounts.'
- 'The thesis provides interesting information on motivational themes and how the organization's personnel reflect on these motivational elements.'
- 'The main benefit of this work was to document an HR project, which was challenging and partly abstract.'
- 'The main benefits for our company are the global contacts that were created during his project.'
- 'Our performance review meetings are no longer just a chat, but rather a systematic discussion where all relevant issues are made compulsory to discuss.'
- 'Understanding the interdependencies between employee and customer satisfaction is very important in our

- organization.'
- 'The project has provided a new and a very valuable insight into the perception of the unit's main internal customers, its role, performance, cooperative approach, and areas for further improvement.'
- 'The thesis has been extremely helpful for the company in order to evaluate the most effective ways for entering the market, as well as understanding the territorial limitations, cultural and socio-economic aspects, and different segments.'
- 'This is a very important learning outcome for us and we already decided that at this stage we will just sell smaller modules and gradually build up the whole concept.'
- 'The thesis has been a useful leadership tool for global leaders in our organization.'
- 'The thesis gives an overview of suggestions on how to increase our business value.'
- 'It was very useful in thinking forward to remote selling in our company.'
- 'With this project we are able to share knowledge and most importantly, a customer service oriented attitude with other key persons in the company.'
- 'Developing internal practices, synchronizing operative processes, assessing the knowledge and training needs of personnel, and improving communication are the specific benefits for us.'
- 'We know the importance of HR and change management but we do not have a unified view of doing it. Now, we can use the framework as one of the tools to handle such situations.'
- 'The benefits for the organization are new ideas and knowledge.'
- 'The research results allowed us to better understand our market segment and find better ways to cooperate.'
- 'The research has fundamentally changed the way we engage with brands and developers.'
- 'Conclusions of the thesis about marketing strategy provide useful information about priorities in selecting distribution and promotional channels in our marketing campaigns.'
- 'The best thing is that the thesis includes eight themes and an implementation plan.'
- 'Thesis work helps us to understand the value networks within the organization and within specific projects.'
- 'It made visible the common issues between different business units.'
- 'It helped us to shape the project in a slightly different way and therefore it clearly influenced our onboarding process.'
- 'The work has increased the efficiency and cooperation between countries and shared services centers.'
- 'This project and its results are useful in our marketing and customer support.'
- 'The thesis helps in outsourcing decisions.'
- 'For the first time there is detailed information of how personnel think about the company.'
- 'The developed framework was the key input for two organizations in planning expansion of R&D activities to Russia.'
- 'The development project resulted in new job opportunities.'
- 'The marketing plan is written in a way that is easy to understand. We were especially pleased with our new online value proposition.'
- 'The thesis summarized the position and difficulties we have locally and how we need to change our mindset in the sales process to stay competitive in a challenging market place.'
- 'The thesis contributed to the development of the management system, with concrete opportunities and practical suggestions.'
- 'As a result of this project, we learned that operations are not prioritized as one of the key processes of the unit, and that the mutual understanding regarding ways of working are not shared. This has had a negative effect on the unit's efficiency.'
- 'Benefits to the organization include a crystalized and more explicitly articulated strategy when it comes to talent management.'
- 'The findings are interesting, especially now that digitalization and startup companies are hot topics in the Finnish marketplace.'
- 'The documentation of the concepts was useful because it has allowed us to revisit the concept for later business development.'
- 'There are some kinds of blind spots in a self-managed organization that could be improved, and this thesis has helped us to find them. When we recognized these blind spots, we can put more efforts into knowledge sharing, with both new and experienced employees.'
- 'Utilizing the different business modeling tools added value in local operations in Vietnam.'
- 'The practical suggestions gave our organization good ideas on how to approach the market, and how to better find potential partners.'
- 'The survey results of user experience and expectations were immediately utilized as inputs in the selection of chat-based collaboration tools.'

Theme 3: Future business benefits - Are there any plans for using the outcomes of master's theses in the future?

Finnish managers in their feedback on the master's thesis indicated 76 future business benefits, which are presented in table 2 in the appendices. To illustrate the findings I present here a few quotations from the feedback provided.

- 'We will use the findings from the thesis. Its findings will be communicated to all employees.'
- 'General management program is a very critical element in developing future leaders in our organization, so clearly this project work will be utilized in further program development.'
- 'As sales agents have the best possible help and have the tools at hand, this will evidently affect the competitiveness and profitability of the company.'
- 'It has fair value for our organization in the long run because it puts together a number of existing theories and creates an easily understandable and unambiguous model which can be used straight away.'
- 'After this thesis, we are able to assess brand functionality better and be more precise in giving instructions to co-operative companies (e.g., advertising companies).'
- 'As longer-term benefits, this work will be used when going through some developmental steps in the near future, when we develop our services.'
- 'For the longer term, the master's student has been able to develop a profound market study which will work as a framework for us in future developments.'
- 'Longer-term benefits come from the understanding of how important is to listen and involve employees in creating and maintaining job satisfaction.'
- 'It shows us important data in order to make our communication strategy in the future. It shows the subjects we have to consider when thinking about our communication strategy.'
- 'We could easier recognize the intellectual capital inside the organization and then be able to utilize it.'
- 'In long term, it will have meaning as a sales and support tool.'
- 'As a result we will be getting better ROI from partnerships, as consumers will appreciate and use the stored content more.'
- 'Based on this thesis we started to build our e-learning network and the findings may be used in the identification of new sales opportunities.'
- 'There are many good suggestions in the thesis that we will take into consideration.'
- 'We will change our development discussions according to the findings of the thesis.'
- 'The thesis will be used in leadership, management and work community training.'
- 'The ten most important leadership elements compiled by the student will be applied in our workshops for locally employed staff.'
- 'The next annual staff survey showed an increase of motivation in our service department, which we viewed as a success of master's students' activities.'
- 'Based on this thesis we started to build our e-learning network.'
- 'The thesis was the starting point for our company to develop a brand and marketing strategy, and to help us mature as an organization.'
- 'The information could benefit our organization and business by producing more accurate selection profiles and more qualified selections during the recruitment process.'

Theme 4: Who has benefitted - Who has benefitted from the master's theses? With whom have the findings been shared?

Inside the organization: employees, the management, business units, product developers, designers, brand managers, the marketing department, leadership, teachers, colleagues, new employees, team leaders, team members, subordinates, the HR manager, the career counseling team, CRM system users, project managers, the development team, the international office, internal customers, the research team, start-ups, salespeople, sales managers

Outside the organization: customers, consumers, partners, onshore partners, offshore partners, market segments, group companies, sales representatives, sales agents, the community, language learners, users, key accounts customers, network contacts, global contacts, advertising agencies, joint-venture partners, clients, international researchers, alumni, bloggers, market segments, experts, guests

The findings presented in this part of the paper provide evidence of business benefits from the UAS master's thesis. These findings are derived from the feedback of 91 Finnish managers involved in the thesis process. In this way, the research findings are validated and the business benefits of the UAS master's thesis are also ascertained by the business world.

CONCLUSIONS

The aim of this empirical research is to answer the research question: *How does working life benefit from the UAS master's theses?* As the findings of my analysis of the four themes (cf. figure 2) demonstrated, the master's thesis brings very specific, immediate (cf. table 1), and future (cf. table 2) business benefits to working life. These benefits are provided not only to internal, but also to external stakeholders of the organizations.

Another outcome from the research is that the paper clearly demonstrates why business and academic collaboration during the thesis process is necessary and valuable (cf. Jakubik 2017; Laine et al. 2008; Tulkki 2008; Wenger 2005). This paper shows the benefits of a collaborative learning approach. I see three value contributions of this paper:

1. It brings value to employers by making explicit the benefits that UAS master's students bring with their theses to their employers and the business world.
2. It increases the awareness *and* competitiveness of UAS master's graduates in the job market.
3. It brings value to educators of UAS and educational policy makers by demonstrating that working life values the contributions from the UAS master's thesis.

I would argue and disagree with Ojala's (2017) conclusion in her doctoral dissertation that 'Compared to the traditional university's master's degree the graduates of the UAS master's degree believed that their degree generates more competence than competitiveness.' My longitudinal, 10-year, qualitative research indicates that the UAS master's degree/thesis creates not only competences but also competitiveness for UAS master's students in the job market. Based on 91 Finnish managers' feedback about the business benefits of the UAS master's thesis I am confident that the competitiveness of UAS master's degree in the Finnish job market is strengthening.

My empirical paper has implications for managers, researchers, educators, and educational policy makers. The *managerial* implications are that the UAS master's thesis proved to be very useful and valuable, not only for students, but also for organizations as employers of master students. From the managers' feedback, it is obvious that they also learned and benefitted from this collaboration. Because this paper made very explicit the business benefits brought by the UAS master's thesis, managers are encouraged to be open to providing future developmental projects for master's students, to providing them career development opportunities, and to continuing close collaboration with UAS.

Implications for *researchers* are that they should continue working on promoting the benefits of the UAS master's thesis, and on increasing the awareness of the differences between master's degrees from traditional universities and universities of applied sciences. The scale of the research could be extended to other master's degree programmes and UAS in Finland and abroad.

Educators in UAS would need positive feedback of their master's thesis tutoring work and they need appreciation from the business world. *Educational policy makers* in Finland could consider if it is wise to have both the traditional university master's degree and the UAS master's degree in the future. The master's degrees of these two different kinds of universities are converging, and both make valuable contributions to knowledge. Policy makers need to make more clear distinctions between the degrees; they should think about how to increase the acceptance of UAS master's degrees in the job market.

As with every paper and research, this one also has limitations. The thesis feedback from businesses was analyzed only for one UAS master's degree programme, i.e., for the Degree Programme in International Business Management (IBMA) of one UAS, i.e., Haaga-Helia University of Applied Sciences, Helsinki, Finland. This limited scope makes it difficult to generalize the findings based on 91 Finnish managers' feedback. However, it provides opportunities for future research. Extending the research scope to other master's programmes and to other UAS could be one direction in research. Another limitation is that my empirical research paper has limited theoretical sources that could be improved by developing theories or by finding relevant existing theories to support the findings and answers to the research questions. In spite of these limitations, I am convinced that the findings are original, interesting, and valuable in academic research.

References

- Jakubik, M. (2017). Solving Business Problems Together Case: A Master's Degree Programme in Finland. *Journal on Systemics, Cybernetics and Informatics (JSCI)*, Volume 15, Number 4, 2017, pp. 53-57. ISSN: 1690-4524 (Online), <http://www.iiisci.org/journal/sci/issue.asp?is=ISS1704> Accessed: 21.05.2018
- Laine, K., van der Sijde, Lähdeniemi, M. and Tarkkanen, J. (2008). Higher Education Institutions and Innovation in the Knowledge Society. Rectors' Conference of Finnish Universities of Applied Sciences ARENE ry.

- Master's Thesis (2018). www.haaga-helia.fi/en/opinto-opas/opintojaksokuvaukset/mgt7lg501 Accessed: 20.05.2018
- Masters' Thesis Process (2018). <https://mynet.haaga-helia.fi/english/studies/thesis-master/Documents/Master%20Thesis%20Process.pdf>. Accessed: June 21, 2018.
- Ojala, K. (2017). *Ylemmät ammattikorkeakoulututkinnot työmarkkinoilla ja korkeakoulujärjestelmässä*. (The university of applied sciences master's degree in the labor market and higher education system). <https://www.doria.fi/handle/10024/134665>.
<https://www.utu.fi/fi/Ajankohtaista/mediatiedotteet/vaitostiedotteet/Sivut/vaitostutkimuksen-mukaan-ylemmat-amk-tutkinnot-tarjoavat-osaamista-mutta-eivat-kilpailukyky.aspx>. Accessed: 24.12.2017.
- Saunders, M., Lewis, P. and Thornhill, A. (2016). *Research Methods for Business Students*. Seventh edition. Pearson (pp. 579-587).
- Students' Guide (2018). <http://www.haaga-helia.fi/en/students-guide/degree-programmes/degree-programme-international-business-management-helsinki-pasila?userLang=en> Accessed: 20.05.2018
- Tulkki, P. (2008). University of Applied Sciences in a Regional Ecosystem of Innovations. In Laine et al. 2008, pp. 119-128.
- Wenger, E. (2005). *Communities of Practice. Learning, Meaning, and Identity*. First Published 1998. Cambridge University Press.

Appendices

Table 1: Immediate business benefits of the UAS master's thesis

IMMEDIATE BUSINESS BENEFITS			
has increased the efficiency and cooperation between the country and shared service centers	practical suggestions on how the organization will benefit	has started to build our e-learning network	having more systematic program follow-up and impact measurement
Has allowed us to better understand our market segment and find better ways to cooperate	impact on customer and user satisfaction	has started preparations for getting funding	a more systematic and coordinated process between talent management and leadership development
has fundamentally changed the way we engage with brands and developers	problem areas where the management system needs to be developed	helps in our marketing	increasing our international impact
we will be getting better ROI from partnerships	several development suggestions were implemented right away	we got new contacts already	we are able to provide a tool set to our project managers enabling them to better manage this challenging part of the project work
consumers will appreciate and use the store content more	how the organization and its practices need to be developed	new channels opened for promoting Finnish e-learning knowledge	we are able to better assess brand functionality
higher consumer satisfaction, retention, and sales	developing internal practices	new business model	we are able to give more precise instructions to advertising companies on how our company should be seen
help in outsourcing decisions	synchronizing operative processes	immense benefits of deploying a scorecard: articulating the value of the output and its delivery	has helped us to implement a thank you event
realizing that knowledge sharing must be extensively promoted	assessing knowledge and training needs of personnel	better understanding of what every individual does in order to contribute to the unit's strategy	new research topics have emerged

confirmed our planned marketing procedures	improving communication	implementing the suggested strategy plan into our work in Finland	gaining real research based data on the topic to support further development, tools and organizational decisions
knowing conditions when buying legal services	using the framework for HR and change management	new insights into our daily work and planning for the future	providing more experience to customers
helping to make our workshops more concrete and comprehensive	helping to understand entertainment industry challenges	making us act locally	we have gained more structure for our loose practices
changing our development discussions	information about motivational themes	starting phase two of the PRM strategy	has helped us to visualize the things we need to improve
have gained useful connections	information about personnel's reflections	having a short presentation about the CRM / PRM for our team members helped us to focus on essential things	has helped us to find the blind spots that need development
successful cooperation projects between Nokia and Russian universities	new method of marketing efficiency	the framework helps our business	understanding the rational and irrational divers on the potential target market
using the suggested internationalization framework	hearing team leaders' ideas, new ways of doing things to enhance communication and collaboration	huge efficiency gains	good ideas on how to approach the market and identifying potential partners
has resulted in new job opportunities	recognizing that we have effective teams	a better understanding the problems in our unit	we are able to re-evaluate the market, when and how to approach it
development of business reporting	getting extra benefits in our offshore projects	presenting the findings has been very positive and this has been a major asset to our company	the documentation of the concepts was useful because it has allowed us to revisit the concept for later business development
contributes to our competitiveness	using specific practices suggested by the thesis	the main benefits for our company are the global contacts that were created during this project	utilizing the different business modelling tools added value in local operations in Vietnam
knowing our brand image	improved sales results	showed us the potential of LinkedIn marketing	using the findings in our incentive design projects
starting point for developing our brand and marketing strategy	a focus on sales initiatives	suggestions support our company very well	have utilized it in our reward training
has increased awareness about our customers' experiences	a team-building exercise	helps to comprehend the overall business challenges of IoT	new knowledge about our international members
has generated discussions about the ways we conduct business	information about our position and difficulties	we benefited from the recommendations	has increased knowledge about our services
opportunity to enhance our organization and services	useful findings for the career counseling team	the findings influence our communication, streamline and simplify how often we communicate to teams about change	new international researchers joined us
service quality become a major goal for us	new information on working life topics was useful	realizing what needs to be done before we are ready to hit the market with this educational concept	has increased interest toward us

improving our offerings of language courses	support our every-day business operations and customer relations	we decided to sell small modules and gradually build up the whole concept	our performance review discussions become more systematic, relevant issues are made compulsory to discuss
improving interactions between learners and native speakers	sharing the knowledge and customer-service oriented attitude in the company	we gained a better picture about the factors influencing the service business and customer satisfaction	the new way helps preparation for performance meetings
helps immigrants to integrate faster	customers appreciated our interest in their feedback	better understanding of the interdependencies between employee and customer satisfaction is very important in our organization	new insights and views were developed
acting more professionally	greater understanding of the needs from the end-users of the CRM system	analyzing the survey results has been beneficial for us	have decided to open a new Facebook-page for our alumni
providing benefits for our customers	validating our development directions	motivating colleagues	the worked proved that our earlier decision to close our Facebook account was wrong
the model provides established theories that can be used straight away	concrete opportunities	increase in motivation in the service department	we are looking for bloggers and technical solutions for our communication
has developing the next round of general management programs	increased awareness of theories, customer needs, competitors' offerings	more articulated strategy of talent management	it has had a great impact on our actions
demonstrated that our company is interested in new service development and it actively listens customers' ideas and needs	we have now a more in-depth understanding of the new approach on contextual feedback	now our start-up has an internationalization strategy	because of the work, we are now aware of the lack of internal communication
some ideas the team were able to implement and set targets	it helped us to see the big picture of internationalization	we are already using some of the outputs of the thesis	we have already implemented new forms of communicating internally (e.g., SKYPE, new Intranet, internal weekly reports)
has been a great base for renewing our training framework	it is easy to implement the delivered strategy	the student has been an additional resource for us	differences among countries are especially interesting to us
has been a useful leadership tool for global leaders	we started to look for a business developer who would also take care of communication	we gained valuable input on what really worked and what did not with our previous approach	validated our assumptions
findings about the market potential and recommendations for future work	utilizing it when pitching or selling our services	it helped us to shape the project in a slightly different way and therefore it clearly influenced our onboarding process	got evidence of some weaknesses in our current approach to collecting feedback
it gave a possibility to the team to learn many new methods	it helped to crystallize our long-term focus	the framework has been applied to Bulgaria	currently we are developing a training program with the help of master's students
the recommendations have helped us to further	it has been a huge leap toward professional business	it helped us to look at our data differently	the most important benefit for us is the identified gaps

develop our export of education			that needed to be addressed
the results are valuable for us			

Table 2: Future business benefits of a UAS master's thesis

FUTURE BUSINESS BENEFITS			
using in creating training materials for employees	development trends in CRM systems in the future	it has helped us to expand our reward business	helps in identifying new business opportunities
considering the findings in developing communication strategy	promoting the export of Finnish education	improves the quality of daily project work	we will start looking into different ways to start promoting this new business opportunity
utilizing the value network explored	help in better understanding similar projects from personnel's point of view	planning to organize teambuilding workshops regularly	the market study developed will work as a framework for future developments
writing articles and publishing them on LinkedIn and Twitter	using LinkedIn marketing as part of our marketing strategy	publishing the findings in the organization's member magazine	information, methods and practices provided long term benefits to the team
using in our future projects	implementing suggestions in our new coming complaint process	bringing more positive credibility to us	we will be seriously considering developmental ideas as they support our current strategies
applying the model in our all group companies	implementing recommendations involves strategic challenges and will be discussed internally	strengthening the bond between the company and its existing strategic customers	using a market study when decisions are made about expansion to Russia
using in new sales opportunity identification	expecting that our communication about changes will be clearer and more straightforward	The outcome of this work will be published for management	recommendations of the thesis will save us a lot of time and help us to move in the right direction
using in planning promotions	believing in saving a lot of money	the work is a good basis for starting to act	using it for improving our employee commitment
introducing suggested practices	recommendations will be taken into account when planning future actions	we will apply the suggested actions	help us to improve our current approach
using implementation and change management processes presented	implementing the same survey on a yearly basis	using the outcomes of the work in planning future events	helps us to systematically further develop our activities
using in leadership, management and work community training	important in developing future leaders in our organization	using it in streamlining the organization's working methods to achieve efficiency and effectiveness of our work	after reviewing the recommendations, our team will consider possibilities for implementation
applying in workshops for locally employed staff	utilizing it in future program development	helps identify possible improvement opportunities	the idea of internship is great and it will be implemented in the short term
extending the framework to other countries (India, China)	supports internationalization of the field and assessment of its impacts	using when planning the marketing budget	launching a full new process in the next few weeks

impacting the financial side of future projects	utilizing in developing our business	next step is to code the working prototype	we will continue to use the findings for the next 12 months
using development suggestions	Actively using change management tools	increase in the effectiveness of daily work	we intend to use the framework when expanding into new markets
using when developing our services	material business benefits by using the change management model	impact on the competitiveness and profitability of the company	the framework will be used for the USA this year
helps in the recruitment process in selecting more qualified applicants	we can apply the same event framework outside Finland all over the world	recognizing the importance of listening and involving employees to create and maintain job satisfaction	we will soon pilot the new training program
we will continue to use the renewed structure of performance meetings in the future	we could put more effort into knowledge sharing between new and experienced employees	planning to develop a proposal for improving the follow up of our members' interests	the new training program will improve the competencies of salespeople that will result in better performance
helps to evaluate activities	expecting an increase in sales	using it as a sales and support tool	gaining better sales results

Material Design And Teaching Technologies Course To The Teacher Candidates

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Abstract

The aim of this research is to examine the views of the students taking Instructional Technology and Material Design course. In this study, one of the qualitative research approaches, "special case study method was used, and the obtained data were collected by" semi-structured student interview form. The analysis of the qualitative data was evaluated by the content analysis method.

The aim of this course is social development, the perspective of educational environment, material development project, material use competencies and the reasons for seeing the teacher training program. It also analyzes the demographics.

The study group of this research consists of a total of 200 students studying at the faculties of Near East University, Sports Sciences.

Introduction

Nowadays, the candidates in the teaching department of the universities are taking courses in the education faculties they study in order to gain the skills and behaviors required in their professional life after graduation. These courses offered in the faculties aim to provide students with the necessary competencies for their own fields as well as having sufficient equipment and confidence in the field. It is seen that one of the educational courses, Instructional Technology and Material Design course is one of the important courses in the teaching formation.

Teaching is the regulation of information and the environment to create learning in general. The environment includes not only the place where teaching is, but also the methods, techniques and tools necessary to convey information and direct the student's work. Information and the environment may also vary depending on the teaching objective in the program. Learning is a product of life and a relatively permanent track behavior change.

There should be an environment for learning-teaching. It is important to create appropriate environments in order to provide training that is considered as a process of behavior change. The field of learning-teaching is called the training environment (Soytekini & Yinal, 2017). Educational environments should be differentiated according to the conditions of the individuals to be educated. A different educational environment should be established for the courses in each level of schools, programs and programs in schools. It can easily be said that if the school, building classrooms and laboratories and the teaching technology and materials are not available or if they are inadequate and almost identical, the educational environment is not suitable.

In general terms, the communication between the sender and the receiver is called a communication that is shared with a shared shopping relationship. This process starts with the message being sent to the recipient by the source and ends with the recipient receiving and evaluating this message and reacting accordingly. A number of behaviors must be performed to achieve communication. There are five basic elements to be considered when examining the communication process. These; source, message, channel, receiver, and return. The source of the communication process in education is the teacher and the recipient. The content of the message program is the textbook or the voice of the teacher, the teaching process of the channel or the methods, technical tools and materials used in the process. Teachers benefit from three types of communication methods. These types of communication are communication with the help of oral, non-verbal and other technological equipment. In order to be a good educator in the education system, it is necessary to know the communication process very well. In the teaching-learning process, a trainer needs to establish a healthy communication with his / her students in order to teach an issue effectively. Communication related to education is related to the interaction of the student and the environment. Detection occurs when the student's senses respond to the message and the effect of the message. As long as individuals reach the consciousness of themselves and the world, it is called perception.

Technology and materials can be made more economical. With the teaching of technology and materials, less time is spent to determine the needs of students and to adjust the teaching accordingly. Less time spent by teachers and students positively affects the speed and cost of schooling. Fast and more economical schooling means that students should leave the school earlier and learn more about the time they stay at school.

If teachers are uninterested or inadequate about using technology and materials, it can be said that the education program will not be successful in ensuring students' learning. Teachers' attitudes and abilities related to technology and material use are effective in students' learning. Some teachers may not have sufficient knowledge of using technology and materials in their courses. Some teachers may also be reluctant to use new technology and materials. In addition, some teachers feel that it is difficult to use technology and materials, they may feel under pressure, or they can rely more on traditional strategies and traditional technologies and

materials. In order to eliminate all these drawbacks, teachers should be given the necessary information on how to benefit from the products of educational technology. In order to meet the three basic requirements in educational applications, educational technologies and materials are used.

In the faculties of education, pre-service teachers are enabled to feel ready for the profession with affective aspects along with cognitive gains. For this reason, it is important that teacher candidates have positive attitudes towards the ÖTMT course which is one of the teaching professional knowledge courses and they are important in terms of designing materials for their own fields and transferring them to students as appropriate (Akay ve Argün, 2006).

It is thought that the use of a skill that includes complex mental processes in this process by the trainee teachers will contribute positively to the future professional lives of the students and the success of the students. For this purpose, it is considered important to examine the relationship between creativity perception and attitude variables towards the course.

Purpose of the Research

In this research, it is aimed to examine the opinions of prospective teachers about the teaching of Instructional Technology and Material Design (SCT) course in different aspects. For this purpose, the following questions were sought;

1. What are the perceptions of teacher candidates who take Teaching Technologies and Material Design course?
2. What are the material design, self-efficacy belief levels of teacher candidates who take Teaching Technologies and Material Design course?
3. What are the attitude levels of prospective teachers who take Teaching Technologies and Material Design course towards the ÖTMT course?
4. Do the teacher candidates' perceptions of creativity differ according to the department?
5. Are the teacher candidates who take Teaching Technology and Material Design course differentiate according to the department?
6. Is there a meaningful relationship between the creativity perceptions of the prospective teachers who take Teaching Technologies and Material Design course and their attitudes towards Instructional Technology and Material Design course?

Method

Research Model

The aim of this study is to examine the opinions of prospective teachers about the teaching of Instructional Technology and Material Design (ITCT). In order to present the views given in this sense, one of the qualitative research approaches, el Special Case Study i method was used.

In this study, it was carried out with the holistic single case design of the special case study because it was the subject of Instructional Technology and Material Design as a single unit of analysis (Yıldırım & Şimşek, 2005). The case study is carried out in a natural environment, such as a class or an organization, and aims to take a holistic approach to the events and environments that are the subject of the study (Phillips and Burbules, 2000).

Working group

Working group; It is comprised of 300 students studying at Lefke European University in the Turkish Republic of Northern Cyprus. As a sample representing the universe, undergraduate students from the Faculty of Sport Sciences of the European University of Lefke were enrolled.

Data collection tool

In order to determine the attitudes of pre-service teachers who took STSM courses towards ÖTMT course, 2013 Attitude Scale for Instructional Technologies and Material Design Course mek which was developed by Çetin, Bahçeci, Kınay and Şimşek (2013) was used.

Attitude Scale Validity

The first step in the development of the ÖTMTDYTÖ was to examine the literature by the researchers and form a pool of substances with statements indicating attitudes towards the instructional technologies and material design course. The item pool consisted of 46 items. Then, 5 experts in the field of educational sciences were interviewed for the superficial (appearance) and scope validity of the scale. According to expert opinions, 5 items were removed from the scale and 3 items were changed (Çetin, Bahçeci, Kınay and Şimşek, 2013). After these processes, the scale was finalized with a 5-point Likert-type rating, which I strongly disagree (1), I disagree (2), I am undecided (3), I agree (4) and I strongly agree (5). The validity and reliability studies of the scale were conducted on three different groups of students who studied at Ziya Gökalp Faculty of Education in Dicle University in 2012-2013 Fall Semester and who successfully completed the course.

The first group consisted of 358 (174 males, 184 females) in which the construct validity, internal consistency reliability and item analyzes of the Attitude Scale for Instructional Technology and Material Design Course were conducted, and the second group of 79 (42 males, 37 females) in which the compliance validity study was conducted, and the test was repeated. The third group consisted of 106 (52 male, 54 female) students. In order to

conduct the validity study of the scale, Attitude Scale for Instructional Technologies (ÖTYTÖ) which was developed by Metin, Kaleli Yılmaz, Coşkun and Birişçi (2012) was used (Çetin, Bahçeci, Kınay and Şimşek, 2013) Explanatory Factor Analysis for construct validity studies. and Confirmatory Factor Analysis (CFA). The KMO value of the scale was found to be .948 and the Barlett Sphericity test was significant ($p < .05$, $Df = 528$). According to these results, it was determined that the data set was suitable for factor analysis. After the data set was found to be suitable for factor analysis, it was seen that 33 items were collected under 3 dimensions explaining 53,83% of the total variance by AFA as a result of principal components technique and direct oblimin rotation technique. The first dimension is defined as ş usefulness ve, the second dimension is eci liking etin and the third dimension is called olarak denial boyut (Çetin, Bahçeci, Kınay and Şimşek, 2013). The correlation between the Attitude Scale for Attitudes towards Instructional Technologies and the Correlation Scale for Instructional Technologies were examined. A positive and significant correlation between the two scales was found. 535. The calculated internal consistency (Cronbach Alpha) coefficient was .94 for the whole scale and .78 to .95 for the sub-dimensions of the scale; test-retest reliability was calculated as .90 for the whole scale and .76 to .88 for the sub-dimensions of the scale. The findings obtained from the item analysis show that the corrected item total correlations of the subscales ranged from .319 to .710. (Çetin, Bahçeci, Kınay and Şimşek, 2013)

Data Analysis

Descriptive statistics were used to determine attitude levels and creativity perceptions. One-dimensional analysis of variance (ANOVA) and multi-dimensional analysis of variance (MANOVA) were used to determine whether there was a significant difference between the attitude levels and creativity perceptions of the students. Pearson correlation coefficient analyzes were performed to determine whether there was a significant relationship between the scores of the scales.

Findings And Comment

In this section, the findings related to the sub-problems of the study were presented and then comments on the findings were discussed and compared with the results obtained in the literature. The views of prospective teachers studying in the Department of Physical Education and Sports in the instructional technologies and material design course were examined in different dimensions. "Professional (, ili contribution to individual and social development alma," material development project esi, "material use competencies değişim," the necessity of taking the course in the program ", instructional technologies and material design (ÖTMT) has been tried to determine the opinions about the course.

Table 1. Descriptive Statistics On The Creativity Perceptions Of Prospective Teachers Taking Instructional Technologies And Materials Design Course

Creativity scale	N	\bar{x}	SS
The whole scale total score	200	44,07	14,70

When Table 1 is examined, it is seen that the teacher candidates who take the ÖTMT course have arithmetical average value (\bar{x} alan = 44,07) of the points they get from the ar How Much of Your Creator den scale. Based on this finding, when the inin How Much Creativity Scale (score is taken into consideration (0-116), the mean of the answers of the teacher candidates who took the ITMT course on the scale of how much creative they have (\bar{x} = 44,07) is higher than the mean (40-64 points). They have a level of creativity perception.

Table 2. Descriptive Statistics Related To The Attitude Levels Of Teacher Candidates Who Took Instructional Technologies And Materials Design Course Towards ÖTMT Course

Courses at ÖTMT			
	N	\bar{x}	SS
Attitude Scale			
Delectatn	200	3,44	0,85
Abnegatn	200	4,07	0,95
Benefit	200	3,75	0,67
Full Scale	200	3,72	0,63

When Table 2 is examined, the arithmetical average value of the attitude scale for the Instructional Technology and Material Design course (= 3.44); It is observed that the arithmetic mean value (= 4.07) of the sub-dimension and the arithmetic mean value (= 3.75) for the usefulness sub-dimension. Based on these findings, "Attitude Scale for Instructional Technology and Material Design Course boyut is a 5-point Likert-type scale. It can be said that the average values of the items are positive because the values that can be taken by the items of scale (1) vary between T Strongly Disagree aday and (5) M Totally Agree neden and therefore teacher candidates who take the ÖTMT course have developed a positive attitude towards ÖTMT lesson.

Table 3. ANOVA Results Showing Whether Teacher Candidates' Creativity Perception Scores Differ According To Their Sections

Variance Source	Squares	sd	Squares	F	p
	Total		Average		
intergroup	901,916	10	90,192	,410	,941
inter-group	81301,171	190	219,733		
Total	82203,087	200			

p<0.05

Table 3 is examined, it is seen that there is no significant difference between the perception of creativity perception of teacher candidates who took Instructional Technology and Material Design course according to the part studied $F(10, 200) = 0.41$ $p > 0.05$. It can be stated that the teacher candidates' scores on the perception of creativity are not affected by the department variable they study. It is possible to explain the reason for this situation as the teacher candidates are being trained in a similar education system in the faculties of education.

Table 4. MANOVA results showing that teacher candidates' attitude levels towards ÖTMT course differ according to their departments.

ÖTMT Attitude
For The Course
Section

Scale Bottom Dimensions	N	\bar{x}	SS	sd	F	p	d	
useful	Social Knowledge. Inst.	17	72,6	14,13				
	Classroom Teacher	36	77,5	10,12				
	English Teacher	20	66,86	15,63				
	Painting Teacher	7	70,5	8,89				
	Science Inst.	16	69,45	11,31				
	Special Education Inst.	25	68,37	17,33	10-370	2,74	0,00	0,07
	Turkish Teacher	18	71,97	13,65				
	Mathematics Teachr	8	74,55	11,09				
	Bote teacher	20	70,09	11,63				
	Music Teaching	11	70	6,21				
	Preschool Teacher	22	67,55	12,66				
	Abnegatin	Social Knowledge. Inst.	17	21,02	4,76			
Classroom Teacher		36	21,94	5,59				
English Teacher		20	19,96	3,65				
Painting Teacher		7	20,66	3,78				
Science Inst.		16	18,85	3,3				
Special Education Inst.		25	19,72	5,61	10-370	1,35	0,20	0,04
Turkish Teacher		18	20,11	4,76				

Mathematics Teacher	8	20,36	4,68
Bote teacher	20	20,25	4,73
Music Teaching	11	19,42	5,35
Preschool Teacher	22	20,7	4,54

Dimensions

Social Knowledge. Inst.	17	34,34	9,96			
Classroom Teacher	36	36,1	5,83			
English Teacher	20	28,13	8,03			
Painting Teacher	7	28,38	4,92			
Science Inst.	16	29,07	5,6			
Special Education Inst.	25	30,54	9,37	10-370	5,76	0,00 0,14
Turkish Teacher	18	30,54	6,04			
Mathematics Teacher	8	31,52	7,18			
Bote teacher	20	28,12	7,39			
Music Teaching	11	29,15	6,3			
Preschool Teacher	22	28,61	6,84			

Table 5. Education Technologies and According to aAttitude Points to Intended Material Desing Turkey Test Findings

Sub-dimensions of the scale	(I) Section	(J) Section	Averages			
			Difference (I-J)	p		
useful	Classroom	Social Knowledge. Inst.	4,9032	,735		
		English Teacher	10,6464*	,010		
		Painting Teacher	7,0085	,602		
		Science Teacher	8,0561	,061		
		Special Education	9,1301*	,025		
		Turkish Teacher				
		Mathematics Teacher	5,5370	,606		
		Bote teaching	2,9558	,989		
		Music Teaching	7,4147	,212		
		Preschool Teacher	7,5085	,464		
		Turkish Teacher	9,9497*	,012		
		delectatin	Social Knowledge. Inst.	Classroom Teacher	-1,7596	,986
				English Teacher	6,2042*	,024
				Painting Teacher	5,9532	,136
Science Teacher	5,2707*			,048		
Special Education						
Turkish Teacher	3,8016			,456		
Mathematics Teacher	3,7992			,479		
Bote teacher	2,8158			,838		
Music Teaching	6,2171*			,017		
Preschool Teacher	5,1842			,281		
Preschool Teacher	5,7245*			,036		
Classroom Teacher	Classroom Teacher			Social Knowledge. Inst.		
				English Teacher		
				Painting Teacher	1,7596	,986
		Science Teacher	7,9638*	,000		
		Special Education	7,7128*	,004		
		Turkish Teacher	7,0303*	,000		
		Mathematics Teacher	5,5612*	,013		
		Bote teacher	5,5588*	,016		
		Music Teaching	4,5754	,089		
		Preschool Teacher	7,9767*	,000		
		Preschool Teacher	6,9438*	,014		
		Social Knowledge. Inst.	7,4840*	,000		

p<0,01

Table 5 is examined, it is seen that the teacher candidates' attitude points towards Instructional Technology and Material Design course show a significant difference according to the departments they study [Wilks Lambda (λ) = 0.823; F (3, 368) = 2.49 p <0.01. When the usefulness subscale of the Attitude Scale for Instructional Technology and Material Design Course is examined, it is seen that the attitude points of the teacher candidates towards the Instructional Technology and Material Design course show a significant difference according to the departments they studied [F (10, 370) = 2.74 p <0.01, d = 0.07]. Similarly, when the sub-dimension of the Attitude Scale for Instructional Technology and Material Design Course is analyzed, it is seen that the attitude points of the teacher candidates towards the Instructional Technology and Material Design course show a significant difference according to the departments they studied [F (10, 370) = 5.76 p <0.01, d = 0.14]. Finally, when the subscale of the Attitude Scale for Instructional Technology and Material Design Course is examined, it is seen that the attitude scores of the teacher candidates towards the Instructional Technology and Material Design course did not show a significant difference according to the departments they studied [F (10, 370) = 1.35 p > 0.05, d = 0.04]. Within the frame of these findings, it is possible to say that teacher candidates who

study in different departments and who take Instructional Technologies and Material Design course have differences in teaching technologies and material design, and find differences in their level of enjoyment.

Table 6. Pearson Correlation Analysis Results Showing Whether There Is A Significant Relationship Between The Teachers' Perceptions Of Creativity And Their Attitudes Towards Instructional Technologies And Material Design Course.

	NKY	YD
NKY	-	
YD	,070	
H	,057	,312**
YR	,046	,247**
BMH	,121*	,121*
ÜBMT	,068	,155**
BMT	,149**	,085

*p< .05; **p< .01

Not: NKY: How creative are you; YD: repudiation; H: Ho lanma; YR: Yararlılık

When Table 6 is examined, it is seen that there is a low, positive and significant relationship between the self-efficacy belief levels and the creativity scores of two-dimensional material design from the sub-dimensions of düzey Material Design Self-Efficacy Belief Scale boyut. = 0.15, $p < 0.01$); Although it was seen that “Material Design Self-Efficacy Scale δ was a positive and significant relation between self-efficacy belief levels and creativity levels about computer material preparation sub-dimension ($r = 0.12$, $p < 0.05$). There is no significant relation between self-efficacy belief levels and creativity levels for three-dimensional material design ($r = 0.07$, $p > 0.05$) (see Table 4.9). According to this, it can be said that pre-service teachers have an increase in their level of creativity, or that an increase in their level of creativity affects the level of self-efficacy belief in material design.

Discussion, Conclusion And Suggestions

In an accreditation study conducted in the USA, the awareness of the technology and materials used in the teaching of the faculty members in the university and the evaluation made in the course of the course showed that the instructors' technology awareness and use on the basis of fields differed (Hora and Holden, 2013). This result is effective in the emergence of differences in the application of ÖTMT course which teacher candidates receive by field educators or educational sciences expert.

Uncovered in studies with teachers in Turkey; negative results such as inadequacy, self-confidence and lack of knowledge, theoretical method and similar results were also observed in studies conducted abroad. As a result of a study conducted by the Office of Technology Assessment in America, teachers and candidates stated that they felt they were inadequate in instructional technologies, did not receive effective training in in-service training, and did not learn the technologies to be included in the teaching (Yanpar, 2011). In addition to this evaluation, it was found that 75% of the universities in the study conducted by the researchers in some states was not a subject related to instructional technology in teacher education (Yanpar, 2011).

Yaman materyalin (2007) in his study with the Turkish teachers stated that they felt inadequate in terms of material design in their fields. It should be noted that the field educator's contributions to the candidates on their professional gains. English teachers who take the ÖTMT course from the education sciences specialist and the other instructors are the most ineffective gain of the course. Erol (2012) 's) Elementary Education II. In this study, it was found that there was no significant difference between the use of instructional technologies and the use of instructional technologies according to gender variable. It is thought that male teachers in the sample may be more interested in using technology than women, and this situation is reflected in education-training environments.

In his study, farklılık A Study of the Instructor of Technology Integration in the Classroom. Draheim and Weber, (2005). he found no significant difference in the use and integration of technology according to gender variable. This result may be due to the fact that 84% of the participants were male and 16% were female. As a result of the study of Dobbins, (2009) there was a difference between teachers' views in terms of gender variable. In the study there is a difference between the use of educational technologies and differences in the use of computers, books, multimedia, audio cassettes, tapes and data projections. According to this, it is concluded that male teachers say that they use more new technologies such as computers and multimedia compared to female teachers.

In a study by Dikici and Sağnak (2010), it was found that the teaching proficiency scale had a positive but low correlation ($r = .126$) between the general teaching sub-dimension and attitudes towards teaching profession, and this correlation decreased when other variables were controlled ($r = .125$).). In addition, it was found that there was a low negative relation between the sub-dimensions of the competency scale and the attitude towards individual teaching and teaching profession ($r = -.124$) and a low negative relationship between the self-confidence of the other sub-dimension and the attitude towards the teaching profession ($r = -.007$). Similarly, in a study conducted by Çelikkaleli and Akbaş (2007), it was found that teacher candidates' self-efficacy beliefs about science teaching accounted for 39% of the attitude variance towards science lesson. In addition, in a study by Özkal (2013), it was found that 6th and 7th grade students' self-efficacy beliefs towards Social Studies course were a strong predictor of positive attitudes. It was found that the self-efficacy belief scores for the Social Studies course could explain 16% to 22% of the variance in the positive attitude towards the Social Studies course. In this context, it is possible to say that there is a similarity between the findings of the eighth sub-problem and the findings from the literature.

References

- Akay, H. ve Argün, Z. (2006). Farklı öğretim süreçlerindeki fen bilgisi öğretmen adaylarının yaratıcılıklarının cinsiyete ve mezun olunan lise türüne göre karşılaştırılması. *Gazi Eğitim Fakültesi Dergisi*, 30 (1), 17-37. Boston: Rowman and Littlefield Publisher
- Çelikkaleli, Ö. ve Akbaş, A. (2007). Sınıf öğretmeni adaylarının fen bilgisi dersine yönelik tutumlarını yordamada fen bilgisi öğretimi öz-yeterlik inançları. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 3 (1), 21-34.

- Dikici, A. ve Sađnak, M. (2010, Eylül). *Öğretmen adaylarının öğretmenlik mesleğine karşı tutumlarının ve yeterliklerinin incelenmesi*. Sözlü bildiri, 19. Eğitim Bilimleri Kurultayı, Uluslararası Kıbrıs Üniversitesi, Kıbrıs.
- Dobbins, K.(2009). Teacher creativity within the current education system: Case study of the perceptions of primary teachers. *Education*, 3 (13), 95–104.
- Draheim, D. and Weber, G. (2005). *Form-oriented analysis: A new methodology to*
- Erol, O. ve Taş, S. (2012). MYO öğrencilerinin bilgi ve iletişim teknolojilerini kullanma sıklıkları ile yaratıcılık algıları arasındaki ilişkinin incelenmesi. *Mehmet Akif Ersoy Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 4 (7), 82-104.
- Lesinger, F. Y., Altınay, F., Altınay, Z., & Dagli, G. Examining the role of leadership, trust for school culture and policy. *Quality & Quantity*, 1-24.
- model form-based applications*. Berlin: Springer.
- Özkal, N. (2013). Sosyal bilgiler dersine yönelik olumlu tutumların özyeterlik inançlarına göre yordanması. *Mersin Üniversitesi Eğitim Fakültesi Dergisi*, 9(2), 399-408.
- Phillips, D. C. and Burbules, N. (2000). *Postpositivism and educational research*.
- Soytekini N & Yınal, A. (2017). New Approach to Entrepreneurship Education in Primary Schools: The BAGENTL.
- Yaman, H. (2007). Türkçe öğretmeni adaylarının öğretim teknolojileri ve materyal geliştirme dersi bağlamında Türkçe öğretiminde teknoloji kullanımına ilişkin yeterlilik ve algıları. *Hasan Ali Yücel Eğitim Fakültesi Dergisi*, 7 (1), 57-71.
- Yanpar, T. (2011). *Öğretim teknolojileri ve materyal geliştirme*. Ankara: Anı Yayıncılık.

Mathematical Reasoning Of Vocational School Students: Vocational Schools Sample*

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Abstract

Educational research has pointed out the problem of rote-learning and the effect of concerning conceptual teaching and learning. Lecture activities in this environment students need to consider this aspect while constructing any task by themselves and teachers must develop teaching activities where this is possible in classes. We present in this study analysis of the classifications with creative reasoning applied to vocational school students. This study focused the model established by Lithner (2008) that discriminates between derivative reasoning that linked to efficient learning of algorithms and concepts, and creative reasoning that includes conceivable math originated opinions. The study includes the investigation of records, lecture textbook, coursework and examinations applied to basic mathematics classes in from different three universities in Turkey with the view to classifying the types of reasoning expected of the students. More over explaining of our application model to Lithner's method, also we focuses validity of the method used a basic factor in this study for categorizing reasoning alternative conditions in our mathematics classes.

Keywords: vocational school, mathematical reasoning, lithner's method

Introduction

There are many mental abilities for students that has a powerful role directly to affect students' mathematics learning but powerful and useful mental activities and non-classic problem-solving skill that known to be closely connected to math accomplishment (Swanson & Alloway, 2012). Educational studies of students' mathematical proving had also positive effected conceptual context of mathematical verifying for better presentation of the different views of students' ability in mathematical demonstrating. The other way involved in students' assessment of math confirmations and rational understanding of many confirmation styles (Antonini & Mariotti, 2008; Harel & Sowder, 1998; Selden & Selden, 2003; Stylianides & Stylianides, 2009). The reporting studies has partial effects of logic training, but, didn't discover the use of arithmetical and algebraic examples as an different of logic training and the effects of such an education program on students' justification of mathematica proofs and rational information of different proof approaches (Bhairst at all., 2008; Unsworth and Engle, 2005).

Calculating skills and routine learning of mathematical rules also necessary for an efficient problem-solving process, since the focus can be settled in the task at widely changing of each small subjects. The connection between some reasoning procedures and math reasoning is basic motif of the results of our experiments in this study (Norqwist, 2016). Lithner (2008) gives reasoning as 'the line of thought adopted to produce assertions and reach conclusions in task - solving'. This description has powerful and ordered or simple points and could not be limited to general analyze of mat theorems. The method is suitable in working the mental analyse procedures needed to explain difficulties in basic mathematics classes, that usually confirmations of the theorem are not presented, in this step learners should compose a simple configuration to make reasonable opinions and decisions during their tasks. Lithner give main differences between imitative reasoning that is connected to repetition education and impression of numerical calculating and imaginative reasoning that includes reasonable math-based opinions. In this study, it is applied the context to categorize the reasoning prospects obtainable in the context of business mathematics offered in the three universities (Bhairst at all., 2008). We are using classes for expert and non-expert students, More over essential and non-essential modules.

Many process and procedure in mathematics are remembered for fast and unforced in lecture. For example, the command of basic operations can be completed to have rapid operation to go to final step. But this operational

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format can also convert to a big problematic situation if it happens without understanding the main idea. Rote learning can be defined as a mechanical repetition of the learning concept (Mullis, Martin and Arora, 2012). According the education researchers, transition from high school (or college) to university is generally recognized as a difficult and painful process and learner usually accept that the transition in mathematics and science classes is especially difficult and a challenging journey (Boesen and Lithner, 2010). Students' problems in first year mathematics turn out to be conceptual approach rather than concrete presentation of mathematics teacher (Gueudet, 2008; Fucawa-Connelly, 2005). Students' problems are especially cognitive understanding of the concepts such as complex numbers, special function, derivate, and deeply analyzing of definition of these concept and their long and abstract proofs. These basic concepts of vocational school mathematics are also used extensively from the students with the departments such as engineering, physic, biology, some social programs. It is a well-known and famous math approach that the study of mathematics be efficient step by step with the development of abstract thinking skills (Clark and Lovric, 2009; Lithner, 2008 Bhaird at all., 2008).

Conceptual Framework

When rote learned notions convert the core information, learner would not answer problems that has changed views from instructor's sample or textbook's application (Weber, 2001). Mathematical proofs are crops of Mathematical demonstrating. Moreover, we prefer to use the term "Mathematical Proving" in this study had used with proof constructions (Harel & Sowder, 1998; Weber, 2001). This skill had been planned as a significant for students' proof and demonstrating (Alcock & Weber, 2005; Selden & Selden, 2003; Bhaird at all., 2008).

In this study, some kind of questions is learner's work equipment's during the investigation period. Lithner (2008) clarified differences between imitative and creative reasoning. Imitative reasoning has the following key forms: memorized and algorithmic. In order to be grouped as memorized a reasoning technique should have involved the following steps: a). The tactic choice is investigated on focusing a whole response. b) The tactic application wants to have the recording version (Bhaird at all., 2008).

The reasoning indorsed by the mission is connecting on the learners' previous information and the textbook, direction, or examples. Learners' reasoning classification going on with the presented mission by their teacher and going on to a response that is the creation of the mission (Norqwist, 2016). The creative reasoning organization can be separated into two subclasses (Dreyfus, 1991): Local creative reasoning; and Global creative reasoning. A problem set is recognized "need local creative reasoning" if it is answerable using any math algorithm but the it wants to be adapted by a math algorithm locally. A problem group is recognized "need global creative reasoning" if the problem doesn't have an explanation that is created on any math algorithm and requires creative reasoning. This kind of reasoning is usually presented at the vocational school level when students are requested to remember a math concept, to state an axiom and a proof of specific theorem (Bhaird at all., 2008). Lithner (2008) gives a reasoning application for creative view if it has the following three types:

- i. An original reasoning arrangement is be activated: Novelty
- ii. Performing of opinions is essential to study on a strategy. This inspires learners be aware of that the decisions are true or not true: Plausibility.
- iii. Background level of student's ideas for the accomplishment of the strategies: Mathematical foundation.

Method

In this study, we applied a question paper from mathematic classes of the different departments of three vocational school in Turkey. The classes contain the mathematics elements. These modules were constructed from the mathematics classes presented to vocational school students. The data in the study contain of the next kinds of question models: classroom notes, textbooks problems, exercises and different questions types. It was grouped all the information with the collaboration of the module lecturers. The data analysis of every element is being directed by the authors of this article (Bhaird at all., 2008).

The exploration method confirms consistency of the analysis of the lecture material from the modules used for this study. We first made the analyzing of the categorization of the examples and problems from our lecture textbook, in order to gain some experience and test our classification methods. These procedures were presented by Lithner (2008). He first constructs an answer to the task and later related them to the lecture papers and text exercises. By focusing his/her context, we examine that the task would be answered by means of algorithmic reasoning and the creative reasoning is required for the analyse. In this period, we observed that the most problematic choices are related about the organization of tasks into the local creative reasoning and we planned the framework as the way that: we define that we could modify a problem as local creative reasoning if the local creative reasoning was settled on an mathematical algorithm (Bhaird at all., 2008; Norqwist, 2016).

Analyses and Findings

We present some examples of tasks designed by the researcher classified using the Lithner reasoning framework. We concentrate on a main subject to be comprehensible status and to be more confidence to relating groups. We select the topic of rational equations, that is important in many basic mathematics classes. In the course for a

question, the classroom documents and the textbook examples of rational equations using the quadratic formulas (Bhaired at all., 2008). Moreover, we present some examples that exemplify the methods planned for this study.

Task 1: Solve the following rational equations, give your answers with different format if it is possible.

- (a) $x^2 - 12x + 35 = 0$;
- (b) $x^2 - 4x - 1 = 0$;
- (c) $6x^2 - 24 = 0$;
- (d) $x^2 - 10x + 25 = 0$;
- (e) $x^2 + 6x + 10 = 0$;
- (f) $x^2 - 12x + 150 = 8x + 54$.

Analysis of the parts of the Task 1:

In this question, students are expected to use the quadratic formula or factorization of the rational equations.

- a) $x^2 - 12x + 35 = (x - 5)(x - 7)$, than the solutions are $x = 5, 7$;
- b) by using of the quadratic formula of rational equations, than the final step of the solution is $x = 2 \pm \sqrt{5}$, with other expression, $x = 4.236$, and $x = -0.236$;
- c) $6x^2 - 24 = 4(x^2 - 4) = 2(x - 2)(x + 2)$, so the solutions are $x = -2, 2$;
- d) $x^2 - 10x + 25 = (x - 5)^2$, so there is just unique solution at $x = 5$;
- e) using the quadratic formula we have $x = -3 \pm \sqrt{-1}$, so there are no real solution;
- f) subtracting $8x + 54$ from both sides gives $x^2 - 20x + 96 = 0$ and since $x^2 - 20x + 96 = (x - 8)(x - 12)$, the solutions are $x = 10, 14$.

Task 2: Give the solutions to the next equation:

$$(x - 7)(x + 4)(3 - x) = 0.$$

Analysis of the Task 2 (Bhaired at all., 2008):

$$(x - 7)(x + 4)(3 - x) = 0, \text{ we conclude that } x = 7, -4, 3.$$

This task is clearly a creative reasoning task, because of that it is a local creative reasoning task. The learners can use the factor method process from their lecture textbook.

We can easily say that the method in this question is an Imitative Reasoning task, more specifically it is an Algorithmic Reasoning application. The learners only need to apply the algorithms from the lecture documents or from the math textbook proposed by the teacher.

Task 3: Firs solution of the following quadratic equation

$$x^2 - 13x + n = 0$$

is that $x = 6$. Tyr to find the other solution of the equation.

Analysis of the Task 3 (Bhaired at all., 2008):

Since $x = 4$ is a solution, we can see that

$$6^2 - 13 \cdot 6 + n = 0, \text{ than } n = 42.$$

Applying the last information, we can solve $x^2 - 13x + 42 = 0$ using either the factor method to reach that the second solution of the equation is $x = 7$.

This approach is a creative reasoning task, especially we can say that this is a global creative reasoning task. We assume that the lecture documents and math textbook have not the concept of index that an algorithm such that or example the students can apply it to solve this question. Students requires to produce an original a plausible approach to reach the number n (Bhaired at all., 2008).

Result

Mathematics students employed much time to apply of the tasks. It is significant to study with these tasks from a learning perspective. It is vital the advance of basic math abilities such as creative reasoning of student that transfer students to powerful and solid mental levels and their assignation with the educational procedure. In this paper, it was focused, to understand student mental processing, an analysis of the classifications study for creative reasoning approach applied to vocational school students. We need to note that the analysis of all questions used for this research for the different classrooms has not been presented in this paper. Thus, we don't give full finding of the research question in the section of findings (Bhaired at all., 2008).

Finally, we believe that it is valuable presen to students, especially vocational school students the chance to involve each of them with the question individually and the teacher need to control student creative reasoning in development of the lectures. Organizations of the subject like the examples used in this study can help teacher to be sure they make stabile their mathematics teaching to confirm that students are faced with a suitable diversity of reasoning studies, and to be aware of an much emphasis on classic and same examples that is to replication of the information presented by teacher. Moreover, positive reaction were given to us from our vocational school students and students' solving of many questions in the task would be a positive energy for us to try producing new studies and application by using creative reasoning approach (Bhaired at all., 2008). According to us, creative application

could be modulated to many mathematical properties or concepts and give us a deeper conceptual understanding of student mental functionality than algebraic computations. So, applications as classroom events can be essential if we aim of our students to become mathematically powerful and well-educated (Norqwist, 2016).

References

- Alcock, L., & Weber, K. (2005). Proof validation in real analysis: Inferring and checking warrants. *Journal of Mathematical Behavior*, 24, 125-134.
- Antonini, S., & Mariotti, M. (2008). Indirect proof: what is specific to this way of proving? *ZDM*, 40(3), 401-412.
- Bhaird, C., Nolan, B., O'Shea, A., & Pfeiffer, K. (2008). An analysis of the opportunities for creative reasoning in undergraduate calculus classes. <https://www.dcu.ie/sites/default/files/smec/pdfs/CMacAnBhaird-analysis-of-opportunities-for-creative-reasoning-in-undergraduate-calculus-course.pdf>
- Boesen, J., Lithner, J., & Palm, T. (2010). The relation between types of assessment tasks and the mathematical reasoning students use. *Educational Studies in Mathematics*, 75, 89-105.
- Clark, M., & Lovric, M. (2009). Understanding secondary-tertiary transition in mathematics. *International Journal of Mathematical Education in Science and Technology*, 40 (6), 755-776.
- Dreyfus, T. 1991. *Advanced Mathematical Thinking Processes*, in Tall D. (ed) *Advanced Mathematical Thinking*. Kluwer Academic Publishers.
- Fukawa-Connelly, T. 2005. Thoughts on learning advanced mathematics. *For the Learning of Mathematics*, 25, 33-35.
- Harel, G., & Sowder, L. (1998). Students' Proof Schemes. In A. H. Schoenfeld, J. Kaput & E. Dubinsky (Eds.), *Research in College Mathematics Education III* (pp. 234 - 283). Providence, R.I.: American Mathematical Society.
- Lithner, J. (2008). A research framework for creative and imitative reasoning. *Educational Studies in Mathematics*, 67, 255-276.
- Mullis, I. V., Martin, M. O., Foy, P., & Arora, A. (2012). *TIMSS 2011 international results in mathematics*. International Association for the Evaluation of Educational Achievement. Herengracht 487, Amsterdam, 1017 BT, The Netherlands.
- Norqwist, M. (2016). *On Mathematical Reasoning*. <http://umu.diva-portal.org/smash/get/diva2:954413/FULLTEXT01.pdf>
- Selden, A., & Selden, J. (2003). Validations of Proofs Considered as Texts: Can Undergraduates Tell Whether an Argument Proves a Theorem? *Journal for Research in Mathematics Education*, 34(1), 4-36.
- Stylianides, A., & Stylianides, G. (2009a). Proof constructions and evaluations. *Educational Studies in Mathematics* Retrieved from <http://www.springerlink.com/content/v2611945638x1763>. doi:10.1007/s10649-009- 9191-3.
- Swanson, H. L., & Alloway, T. P. (2012). Working memory, learning, and academic achievement. In K. R. Harris, S. Graham, T. Urdan, C. B. McCormick, G. M. Sinatra, & J. Sweller (Eds.), *APA educational psychology handbook, Vol 1: Theories, constructs, and critical issues* (pp. 327-366). Washington, DC, US: American Psychological Association.
- Unsworth, N., & Engle, R. W. (2005). Working Memory Capacity and Fluid Abilities: Examining the Correlation between Operation Span and Raven. *Intelligence*, 33(1), 67-81.
- Weber, K. (2001). Student difficulty in constructing proofs: The need for strategic information. *Educational Studies in Mathematics*, 48(1), 101 - 119.

Mathematics Becomes Painting Creations

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Abstract

A joint experience, in teaching Mathematics, of the Architectural and Engineering Schools of the Politecnico di Milano and Universidad de Granada is presented.

The results, proposed in Informatics Laboratory, are the applications of the basic knowledge related to the definition and behavior of two-variable functions and of the language of Parametric Geometry. Precisely, mathematical methods providing metamorphosis of tridimensional objects are considered.

The goal is to show how mathematical topics, of a certain difficulty, are actually justified in a historical context and are, therefore, made appreciable through graphic applications of remarkable vivacity and unpredictability.

Keywords: *Laboratory activity; functions of two variables; parametric surfaces*

Introduction

When thinking of Mathematics, one can often think of an arid, however precise composition of numbers, formulas, theorem proofs.

If one is more open minded, one can also think of mathematics as of an indispensable support to the applied sciences, such as Physics, Biology and Chemistry for the observed phenomena simulation.

One rarely considers Mathematics as a free expression of an idea allowing space for imagination and the aesthetic sense. Yet Mathematics means also this, and, mainly this, for some mathematicians. Thus, a certain kind of Mathematics - inasmuch as it is free and abstract - is much closer to Poetry and Music than to the exact and experimental sciences, to which it is commonly associated: *The poet must be able to see what others do not see, he must see more deeply than other people, and the mathematician must do the same ...* (Sofia Kovalevskaya, 1850-1891)

The most significant turning points concerning mathematical thought emerged out of simple but deeply innovative ideas. One example of mathematical expression, certainly originated by imagination more than by logic, is Analytic Geometry. To imagine and to invent how curves, surfaces could be represented not only with the help of drawing instruments and the brush, but also through a few simple mathematical equations, demanded a kind of sensitivity which neither the architect nor the poet possessed, yet still one which, for its characteristics, we can name artistic.

One can naturally make a different use of what has been imagined and then proposed to him/her. (In Poetry, for example, metrics can be considered both as a binding law that, since it must be respected, can lead to correct, irreproachable, albeit sterile results, and as starting point, a hint to create literary masterpieces: it all depends on how somebody's principles are interpreted and elaborated by somebody else). Analytic Geometry, just as metrics, can be used as a means to classify and manipulate acknowledged shapes, but, above all, to elaborate new ones, either already looked for or still unpredictable, thus opening the way to new creative horizons.

Supported by the idea that mathematics can be deemed intrinsically beautiful and creative and that it can project its aesthetic and artistic taste on what it creates, we would like to show, in this paper, how the mathematical ideas acquired in Analysis and Geometry courses from young students in Architecture or Engineering can offer, thanks also to modern technologies, graphic results beautiful and very unusual results.

Through these results it is our belief that students succeed in sympathizing with Mathematics, but above all they are able to become familiar with the real three-dimensional space and be concretely aware of the shape qualities of 3D objects.

Experiments in computer laboratory come from the experiences of two different Universities: Schools of Architecture and Design of Politecnico di Milano and University of Granada Schools of Civil Engineering and Building Engineering.

Functions Of Two Variables: Short Historical Excursus

The history of Mathematics is as fascinating as the life of man, since it has accompanied him throughout his life. We take a quick tour of History, to find out how the concept of function has been developed.

The instrumental nature of Mathematics appears naturally in the Babylonian culture, a group of peoples who lived in Mesopotamia, for the resolution of everyday economic problems: numerical record of assets deposited in temples, geometric calculations, construction of algorithms. In their astronomical studies, they tried to predict certain events, from the observation of various phenomena. We have found tables with squares, cubes and inverses of natural numbers. Undoubtedly, implicitly, these tables define functions of N in N and of N in R .

From the Egyptian Mathematics, the oldest data we have, come from two documents: the Moscow papyrus and the Rhind papyrus (also called by the name of its scribe, papyrus of Ahmes) from about 1800 b.C and 1650 b.C, respectively, and whose contents could be dated to approximately 3000 b.C There is evidence of a table with the decomposition of $2/n$ into unit fractions for odd numbers n from 5 to 101.

In classic Greece some relations between the elements of two sets were also used, the closest thing to the concept of function. What stands out most is the use of proportions of numerical character, with magnitudes of the same type.

Ptolemy introduces the sine function, with a string table, although in reality there is still no idea of a variable or function.

In the Middle Ages, not enough was advanced in the concept of function due to the disproportion between the level of abstraction, which was already had and the lack of adequate mathematical symbolism.

In the fourteenth century the French mathematician and astronomer Nicolas Oresme stands out, for geometrically approaching the study of changing phenomena, by means of rectilinear segments, which reminds us of the graphic representation of a function, but with the lack of the current sense of dependence.

The schools of Oxford and Paris have played a fundamental role in the development of the general notion of function.

In the Modern Age, the formation of the concept of function, is located in the seventeenth century with Galileo, Descartes, Fermat, Newton, Leibnitz.

Due to Newton, among others, the development of functions in infinite series of powers is studied, which makes possible the analytical representation of the vast majority of functions studied then.

Leibnitz in his manuscript of 1673, *Methodus inverse tangentium, seu de functionibus*, uses the term function for the first time.

In the eighteenth century, Jean Bernouilli uses the word function with a meaning closer to the current.

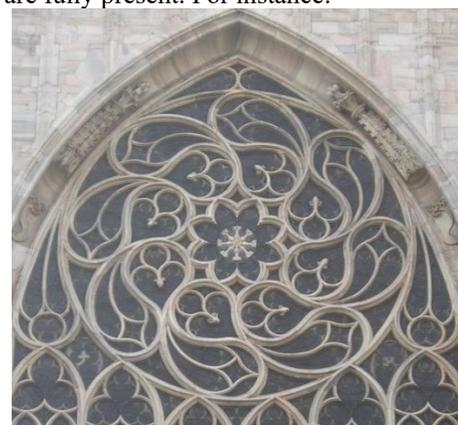
It will be Euler in his work *Introduction in Analysis Infinitorum* (1748) where he makes a detailed study of the concept of function, classifies the different types and we owe him the current notation.

Lagrange in the *Théorie des fonctions analytiques* (1797) systematically developed and applied widely the differential and integral calculus of multivariable functions.

Functions Of Two-Variables: The Teaching Environment

We put special emphasis on the fundamental role played by function of two variables concept in Architecture, Sculpture, ornamentation of some buildings, as well as in the construction of great works, such as bridges.

It is important that the student is aware and knows how to see in the Art, in the great works of Engineering, even more in Nature, the beauty of Mathematics. For this reason we propose to students a brief visual review of some emblematic buildings, constructions, etc. in which the mathematics are fully present. For instance:





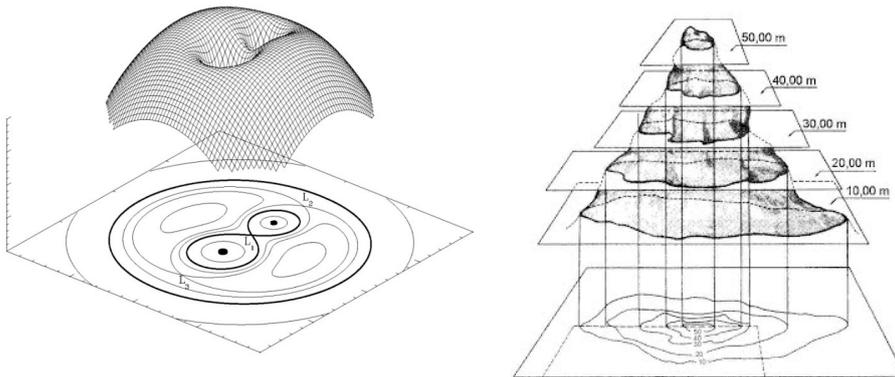
Function Of Two Variables: Some Topics In The Didactic Course

Here in the following we present a short summary of program of the courses:

- The concept of Cartesian product is remembered, and as a particular case R^2 .
- The concept of real function of two real variables is introduced.
- Analogous to the functions of a variable, the domain, the maximum domain and the image of a function of several variables are defined.
- The different types of functions are studied, among them: the polynomial functions of several variables, functions of separate variables, ... etc.
- Continuity of functions.
- As a particular case of polynomial functions, quadratic forms are studied in detail, whose incidence is fundamental for the study of optimization.
- Matrix and polynomial expressions of a quadratic form, as well as the relationship between both. The classification by minors and eigenvalues is studied.
- Theorems of continuity.
- Level sets.
- Obtaining the sense of the growth of a function, from the level sets.
- Drawing of the feasible region of an optimization problem with inequality constraints.
- Resolution of optimization problems with inequality restrictions.
- Resolution of linear programming problems.

In the computer classroom, with a specific program, students learn to draw the functions of the variables and their level curves. It is one of the clearest ways to identify absolute maximums and minimums, provided that the appropriate conditions are met (Weierstrass Theorem). They can solve using the graphical method problems with inequality constraints.

Let's see these examples of contour lines:



Given the difficulty of the topic, it seems to us that it is opportune to preliminarily observe the graphic representation of functions with two variables of various types to highlight the problems of regularity that will be treated in a rigorous way in the second half.

We therefore pose the problem of 3D function graphics.

Parametric Surfaces

Most surfaces and curves in Greek geometry are defined through characteristic properties valid only for them, which are generated, with the help of drawing instruments, through *ad hoc* methods.

In order to overcome this restricted method of operating, one needs a radically different point of view, a method that can be applied to curves and surfaces, without being distinctive of any of them, but rather more concerned with the main and general features of the process than with its refinement and precision.

A decisive step was made with the introduction of the Cartesian coordinates by the philosopher and mathematician Descartes (1596-1650). Descartes publishes his great work "La Geometrie" in 1637, where the birth and expansion of Analytical Geometry is established, which will allow the interpretation of curves and surfaces and the idea of dependence between two variables is expressed for the first time. Along with Descartes it is fair to mention Fermat, who formalized the equation of a line (with the notations of Viète).

A point, in the tridimensional space, is characterized by its x, y and z coordinates: if these vary without restrictions, the point describes the entire space, but if instead the coordinates are bound by a mathematical law, the corresponding point generally describes curves or surfaces. Complicated and intricate curves have already been described since the end of the seventeenth century: among them are the *geometrical flowers* by the Italian mathematician Grandi (1671,1742), a real *virtuoso*.

In analytical or Cartesian Geometry curves and surfaces are graphed by plotting points, being thus totally independent from a curve or specific surface, which is defined only by its equation.

This is not a new Geometry, but it is a new language. Cartesian formulation is therefore more powerful and agile than that of classical Geometry.

A further greater flexibility is then obtained from the Cartesian coordinates system with the introduction of parametric equations, that is using the language of Parametric Geometry. The coordinates of the "moving" point on a surface are described as a function of two parameters, which changes linearly. For instance the Cartesian equation $z=f(x,y)$ can become:

$$\begin{cases} x = u \\ y = v \\ z = f(u, v) \end{cases}$$

These equations are more easily computable and therefore lend themselves well to a graphic usage (particularly if computerized).

In conclusion, through the graphic representation, the characteristics of regularity of the functions are therefore highlighted to the students who can, consequently, observe and deepen their study.

Goals Of Proposal

Suppose that the student has understood the basic language with which to describe a function of two variables and that, through this knowledge, is able to use the language of parametric geometry, understanding its potential, to interpret and draw surfaces.

At this point our goal is to put the student in front of the ability to view, apply their knowledge and also have fun, with the use of simple computer tools for graphics.

The experiment carried out in an informatics laboratory is of a graphic type, thus giving back an image, making a synthesis between the use of the parameterization of a surface and the knowledge of the graphs of classical functions of two variables, .

The result is incredible and suggestive images, which the student will judge, not only in terms of mathematical characteristics, but also of beauty.

Activity Description

More precisely we will try and show how a plane figure, which may be generated and expressed through formulas, can develop, either arbitrarily or according to a set aim, into various three-dimensional shapes. A precise mathematical rule, one which is apt to preserve through mutations those characteristics that can be defined, even if not always appropriately, topological of the basic figure, will be required here.

Let us take into consideration a basic geometrical shape, namely a flower shape similar to a *rodonea* by Grandi.

The parametric equations of the curve tracing the contour of the flower are the following:

$$\begin{cases} x = r \sin(8t) \cos t \\ y = r \sin(8t) \sin t \\ z = 0 \end{cases} \quad 0 \leq t < 2\pi \quad (1)$$

where the parameter t is the angle (measured counterclockwise) between horizontal and the line through the center of the flower and the current point of the contour of each petal, and r is the maximum of distance of this point from the center of flower.

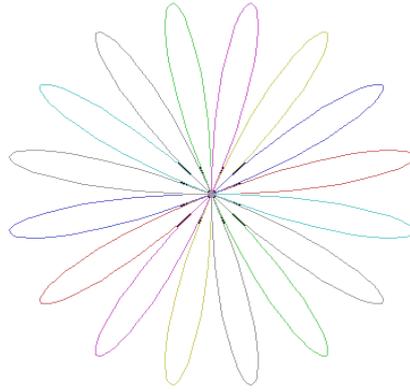


Figure 1

Let us notice from Fig.1 how the flower has 16 petals; actually the distance of the point of flower contour from the flower center is zero for the angles $t = k \frac{\pi}{8}$ ($k = 0,1,\dots,16$).

A flat surface results from filling a proper area inside the contour of the flower; we obtain its equation by introducing a second parameter characterizing, in a variable way, the variability of the distance from the flower center. That is:

$$\begin{cases} x = rv\sin(8t)\cos t \\ y = rv\sin(8t)\sin t \\ z = 0 \end{cases} \quad 0 \leq t < 2\pi, \quad a \leq v \leq 1$$

in Fig. 2 $a = \frac{8}{15}$.

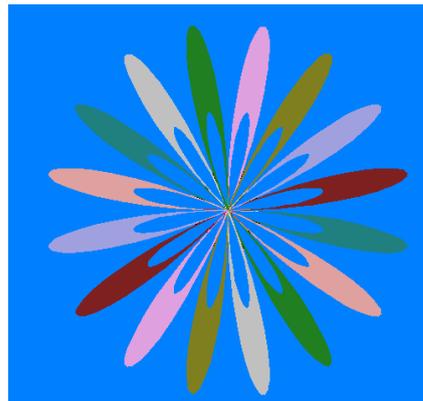


Figure 2

The central idea to the process consists now in developing this basic shape according to a fixed mathematical law, although leaving the results a large margin of unpredictability. Obviously the law which links two parameters is a real function of two independent variables

We have thought of a metamorphosis law leading the flat-planed shape within the three-dimensional space, through its projection upon different surfaces. From a mathematical point of view this means that the third coordinate in the parametrization, describing the developing surface, must be properly subjected to variations.

A first example (see Fig.3) shows the projection of the basic figure upon a saddle surface (hyperbolic paraboloid) of parametric equations:

$$\begin{cases} x = v \\ y = u \\ z = v^2 - u^2 \end{cases} \quad v, u \text{ real parameters}$$

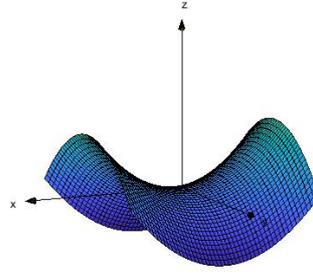


Figure 3

on which the basic figure is projected (see fig.4).

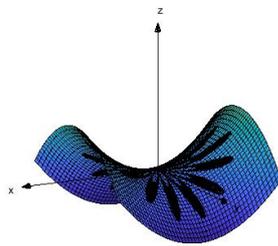


Figure 4

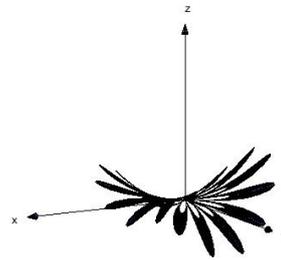


Figure 5

The projection (see fig.5) has the following parametric equations:

$$\begin{cases} x = rv \sin(8t) \cos t \\ y = rv \sin(8t) \sin t \\ z = (rv \sin(8t))^2 ((\cos t)^2 - (\sin t)^2) \end{cases} \quad 0 \leq t < 2\pi, \quad a \leq v \leq 1$$

In this first example the chosen surface is very regular as a consequence of the regularity of the function that defines it.

You can then choose less regular surfaces with the presence of discontinuity (or weakening of the derivability) of the function.

For instance in fig. 6 the basis form is projected on the surface of parametric equations:

$$\begin{cases} x = v \\ y = u \\ z = \frac{v^2 u}{v^2 + u^2} + 10 \end{cases} \quad v, u \text{ real parameters (except } v = u = 0)$$

which for $v=u=0$ has a weak discontinuity and partial derivation discontinuous.

The resulting surface equations are:

$$\begin{cases} x = rv \sin(8t) \cos t \\ y = rv \sin(8t) \sin t \\ z = 10 + rv \sin(8t) \sin t (\cos t)^2 \end{cases} \quad 0 \leq t < 2\pi \quad a \leq v \leq 1$$

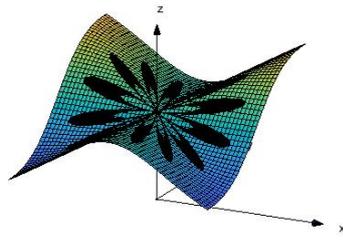


Figure 6

In conducting the proposed laboratory activity, it is therefore evident how the student is stimulated to deepen the study of the characteristics of functions of two variables, finalizing the enhancement of their creativity.

Results

Hence our imagination was let loose ; the projection surfaces have been progressively chosen for their greater geometric complexity and the figures we obtained have taken unbelievable shapes, now light, subtle and elegant, now strong and aggressive ; at times we can recognize them from their basic shapes, at times we can't, since they look absolutely different, but, full of harmony or confused as they may turn out to be, they are nevertheless always in tune with the geometry appearing on the chosen projection surface.

The colors themselves, which have never been modified by graphic programs, fade or become more intense according to the shape alterations, spontaneously contributing to the aesthetical research of the final shape.

One can remark how the symmetry and the regularity of the projection surface are reflected on the symmetry and regularity of the projected shape and how, on the contrary, the discontinuities, the harshness and the asymmetries of the projection shape can alter the original symmetry and regularity.

In the first instance we obtain continuous and smooth shapes (Figs. 7-13), while folds or edges become evident when irregularities arise in the derivatives of the function used. Discontinuities in the function and in its derivatives determine the examples in Figs. 14-18. The surfaces in Figs. 19-27 show examples of "paintings" obtained from the same basis form by the composition of different surfaces with different regularities.

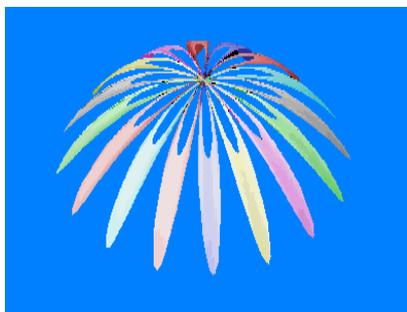


Figure 7



Figure 8



Figure 9

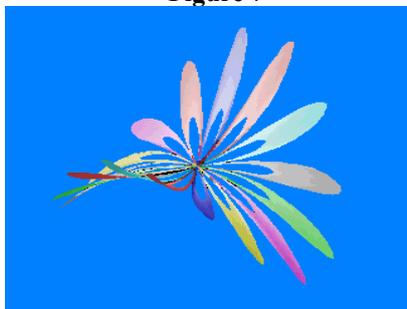


Figure 10



Figure 11



Figure 12



Figure 13

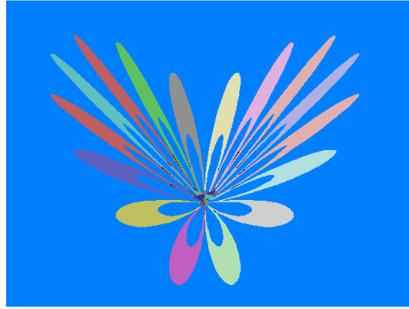


Figure 14

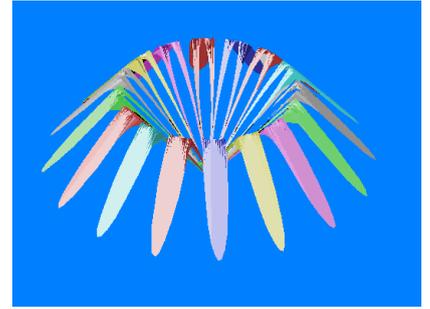


Figure 15

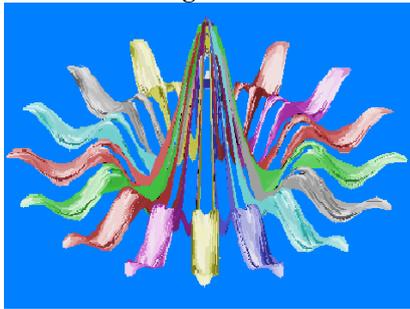


Figure 16

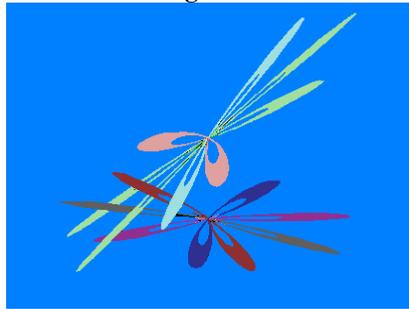


Figure 17

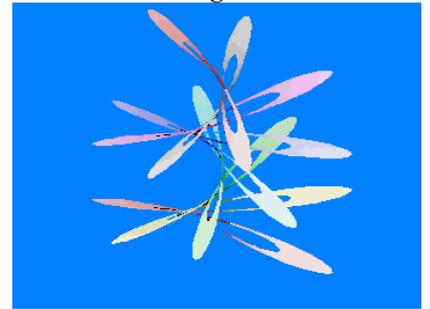


Figure 18

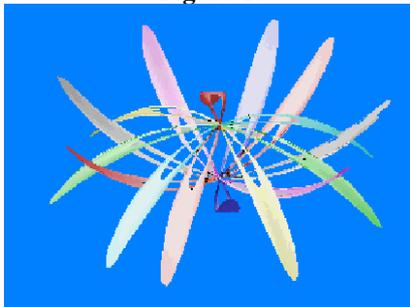


Figure 19



Figure 20

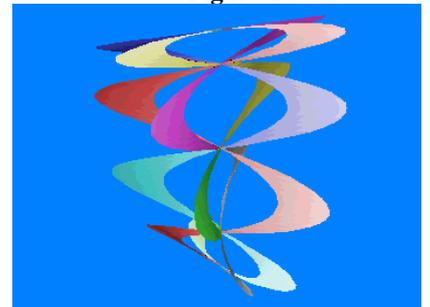


Figure 21

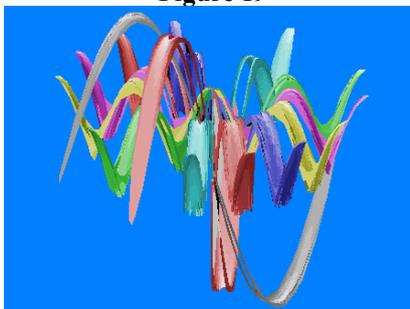


Figure 22

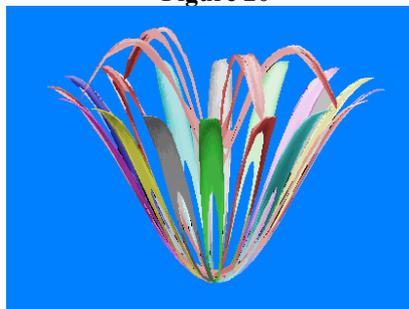


Figure 23

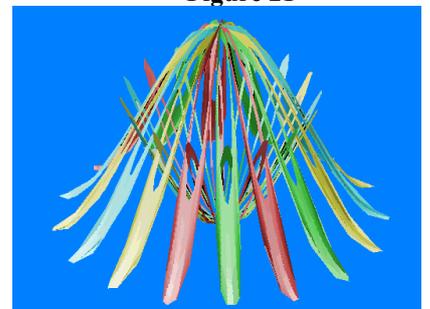


Figure 24

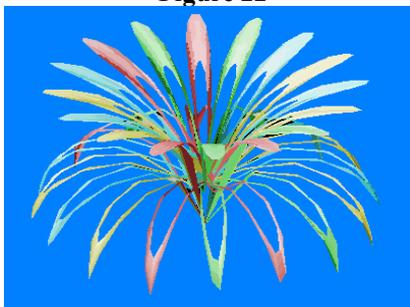


Figure 25



Figure 26

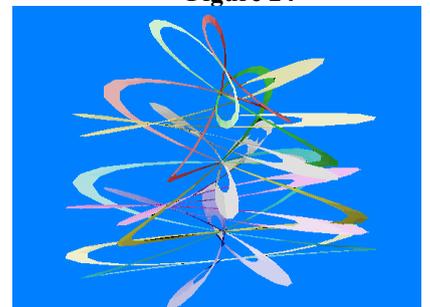


Figure 27

Final Remarks

All figures have been produced with the help of a graphics animation program, simple to use, that is structured in such a way as to allow us to deal with the parametric shapes in the best way. The program has been elaborated by our research group. Any other graphics program that can see the parametric shape of the surface as an input can be used for this purpose.

The results of our work are to be seen in the images here reproduced, which at times have pleasantly surprised even ourselves. Above all they have stimulated us and suggested the way to single out further potentialities of the mathematical and data processing instruments.

Those, who may like to use it, will decide how to deal with this typology of results. If a mathematician, he/she could study geometry on a particular form; if a designer, he/she could devise an object to which the resulting shape may function as a support, or more simply, if he/she feels like it, one could simply enjoy its aesthetic quality.

REFERENCES

- Boyer, C. B. (1999) *Historia de la Matemática*. Madrid, ES: Alianza Editorial.
- Caliò, F. & Marchetti, E. (2017). *Curves and Surfaces: Method and Creativity in Design Process* (pp. 688-693). Tojet special issue for INTE 2017.
- Caliò F., E. Marchetti & Scarazzini E. (1996) *Operazioni e trasformazioni su vettori* Milano, IT: Citta'StudiEdizioni.
- Caliò F., Lazzari A., Argeri M. & Sesana D. (2011) *Geometria vettoriale per la grafica* Milano, IT: Citta'StudiEdizioni.
- Caliò F. & A. Lazzari A. (2017) *Elements of Mathematics* Bologna, IT: Società Editrice Esculapio.
- Grandi G. (1728) *Flores Geometrici, ex Rhodonearum, et Cloeliarum Curvarum descriptione resultantes*
- Marchetti E. (1998) *Linee e superfici* Milano IT: Citta'StudiEdizioni, Milano

Mathematics Curriculum and Mathematical Process For Vocational Schools in Turkey*

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Abstract

Every pure mathematicians and mathematics educations researchers have an idea about mathematical abilities, and this point haven't regularly argued subject between them. Also, people know that subject is one of the very essential main abilities and performance. Many mathematics educators believe that the center problems of students has not about effectively apply to their scientific background to social areas or in their work. Mathematical activities for laboratory studies of our vocational students and their branch studies has an important aspects for these department students. Moreover, we can see many problems of our students when they are learning and making different area activities at the vocational school in our country. In this paper, we are focusing the analyzing of mathematics curricula of our students. Moreover, we analyses our subject and its environment which is essential for the technical programs in these school. As a result of this study, it is difficult to say that there are a unique basic fundamental math lecture program for technical and social programs of vocational school. Also, every department should organize their special mathematical curriculum needed for them and should focus to mathematics subject in its special curriculum.

Keywords: vocational school, technical departments, mathematics curriculum

Introduction

The uncontrollable new conditions coming in our life in everywhere of the world and in this new position everybody should integrated the new life environment, so our students need to have this information from their musters or teachers. Scientific programs at the vocational department help their members to prepare them to new life environment. This new criteria give to students a good advantage of mathematical study area. A good level of student coming with the new position by all scientific abilities performance reactions and moral energy to going on to stay learning according to his/her special interest. So, we believe that the new modulated curriculum give many students a standard of manage their life perfectly (Wenger, 1999).

For many vocational students in turkey, mathematics has a powerful position in school program. Vocational schools give its students to make many applications in many subject of mathematics. More over the classes in this schools give its students a special thinking perspective that this course has very effective role on our mental development. The teacher of this course developed relations by in forcing math mathematical situations with its component and this new situation is not the same of nature of vocational school conditions (Dalby and Noyes, 2015). According to us to make useful and efficient connection with the element of the subject should have a pedagogical base and classroom positive reaction.

By the connection of this way, educational activities and vocational school perspective has the good coherent. Our observation tell us that this new environment in vocational culture present a positive atmosphere for their teachers and students (dalby & noyes, 2015). Studies on the finding of vital context of the lecture in the all curricula program give necessity an important way that focusing original situations and teaching methods of organizing math lecture in every curriculum. It is clear that by developing new technologies and their adaptation to education environment modified the position of teacher and students also all methods used to teach and learn to lectures. Operation and basic algorithms has a powerful effect on the organizing and conducting math lectures. In new educational environment student has a good chance to make mathematics quickly and painlessly using technological material in their studies. We are observing in our lectures that they are operating many calculations and many operation not to spend much time. (Ernest at all, 2004).

According to this researcher team, in the effective teaching program, students adapted in to the context of technology. Technology should be modified to the mathematics content in all possible conditions. Such a curriculum takes necessity technology programs and module the learning and doing of mathematics, so students spends much time algebraic skills and conceptual understanding.

Every math lecture in the program have some important objectives that provide a math method that they have to be familiar with all method and organize the all item of this concept to reach the maximum accomplishment. Positive conditions about the math development process had modulated in some special particular branches. A very important point in this step has a special way in its context which they have to be effectively correlated with modificate the new methods into the lecture.

The math approaches that has powerful effect settled in seven steps;

* A brief version of this article presented at INTE 2018

The mathematical processes that support effective learning in mathematics are as follows (dalby & noyes, 2015);

- Computational tools
- Reflecting
- Connecting
- Communicating
- Reasoning
- Problem solving
- Representing

Mathematics lectures for vocational schools

Mathematical environment develops expressive, helpful and effective at the level they used in submission. In other words, program need to have the learning of mathematics in the answering of difficulties based on real-life applications. All departments in vocational schools in turkey are a complete basis of active backgrounds for the study of mathematics. For example, problem-solving application be done for many departments, as construction technology, computer programs, business, electrics and chemistry (Hyland, 1999).

The constructional parts within the Turkish education system can be placed back to the different system of schools related elementary and adult education. The educational system has continued without a coherent discipline for education (Robert at all., 2005) the vocational education traditions that have grown from these basic areas aim different curricula.

The advance of math information has a hierarchic procedure. A well-organized and unremitting database has necessity to give the people understanding of the concept deeply. The basics of significant context, definitions, theorems and methods were modulated at the all level of grades. The links between secondary school and high school mathematics and the transition from high school mathematics to university mathematics are very important in the student's conceptual development of skills and abilities (Dalby & Noyes, 2015).

Student's and teacher's position in math lecture

Teacher and students position in the math lecture can be expressed as very responsible role. They have responsibilities to develop an efficient instruction programs and methods to provide their students to well understand the lectures for their lectures and also constructing efficient ways on determination their students understanding position. Also, they need to know their development level of all activities about school program as algorithmic abilities which are important to understand teacher and lecture book presentation. All educational person of vocational school needs to present the same pedagogical and educational perspectives to all students and in all classes for many students' position and also, they present different learning environments and positions for every learner (Ernest at all, 2004). Every teacher need be aware of a main reality that their students want to have a powerful mathematical background to accomplish the difficult concept of mathematics and modulate them into other area of mathematics effectively and painlessly. Another important role of the teacher to help the students to accomplish the understand math which essential and powerful item to applicate basic math concept to other scientific area in their school programs (Dalby and Noyes, 2015).

Every education member need to be very familiar relation with teaching, learning and assessment modals so he/she have many alternative way for student to make better their learning skills, mathematical abilities, application to many scientific area which are in curriculum context and solve the problems that are not directly connected the problems solved in the classroom by his/her teacher or in lecture books as example or exercises. Such a program context was given the students in the classroom will make very positive effect on students' learning and their feelings about the schools and feeling about their teachers and school stuff and such an educational presentation will provide many advantage student's social life and working life if they work outside of the school. And finally, they feel very positive about the lectures especially mathematics if the above subject be applied to math.

As mathematician we believe that if a school program modified to mathematics lecture very effectively, students take some responsible roles in their program with their teachers to reach the maximum level good results of the program and high-level accomplishment at mathematics lectures. Also, to reach to best result of well-organized program, the motivated students want to be active in the mathematic lectures which is necessary for the good results and sometimes they try to make some lecture activities themselves. At the end of the well-organized procedure students will be aware of the very important reality of their education life that a very closed relation is essential between showing active performance and to reach to very good position at school achievement. We need to add that some negative results or unexpected situations could be seen at the end of the program application, for example, a few students don't want to be take some responsibilities for the mathematic lectures and maybe they feel that it is difficult to take such responsibilities to accomplish their school program and this is not necessary to do (Dalby and Noyes, 2015). Usually there is a solution for these students that firs teachers need to be learn the

reason of the motivation problems than they will give some psychological directions if necessary. So, it could be taken some good results for these students at the end of the education program. Many education systems apply such a solution to give them to reach best result in school life, social life or working life.

Mathematics lectures in the programs

Special math programs are applied on the all vocational school departments according the context of these programs. We note that the basic teaching principles are the same for every department of the vocational programs. In such a program students' targets are learning of the subjects most efficiently by their best conceptual and computational understanding of mathematics and its scientific nature which is directly related to best understanding. We also add to that such a program and its pedagogical elements constructed to give student the chance composing of a powerful conceptual backgrounds in mathematics so they will manage their information's with an efficient connection the other concept of mathematics perfectly.

A well-designed lecture program gives positive results for students' departments expectations and their possible working position according to their department. For the all department of the vocational school math curricula, math laboratory studies which students are active in the lectures as computer applications, math processes and/or methods that are modulated mentioned as above, math books or other lecture materials in which all concepts of the lecture are presented according to students' department level are accepted as essential to a balanced approach for the lectures in the vocational school program (Dalby and Noyes, 2015).

The basic math processes determined in math curricula of vocational school math that are problem solving (it is one of the main processes need to learned all math students carefully because of its power to understand mathematics more effectively), reasoning (the other name of making mathematics or a necessary tool to operate mathematics concepts, to understand the relation between mathematic concepts and the application of this subject the other scientific area), selecting tools or materials (mean that doing mathematics with the all equipment, for example, all geometric materials or computer or some concrete box using the lecture), connecting (another ways to be aware of some relations between mathematic concepts, for example, between numbers and functions, or equations and operations, also the relation mathematics subject and other lecture branches of the vocational school), reflecting (as one of main critical point for student to organize it correctly because of its nature) representing (to give a mathematic model or geometric figure which explain what is the meaning of the concepts carefully), and communicating (as a social concept, it is important doing efficient mathematics between mathematicians or mathematic students or other students who are using mathematics concepts (Robert at all., 2005).

In the vocational schools, each of departments' mathematics courses contain a set of modules of the concept which determine, and effect student's department abilities and capacities modulated in these essential processes. It is clear the we need apply the math processes to student learning and our teaching in all areas of a math course and in all lectures of every vocational school departments. A balanced or well-organized math program at the vocational school level includes the development of algebraic skills and application dimensions. The designed curricula prepare students with the algebraic skills they need to understand other aspects of math that they are learning, to solve meaningful problems, to apply their program lectures and to continue to meet with success as they study math in the future (Dalby and Noyes, 2015)

The math skills required in each course have been carefully chosen to support the other topics contained within in the program. Computers and other appropriate technology will be used when the primary purpose of a given activity is the development of concepts or the solving of problems, or when situations arise in which computation is not much important.

Vital point: math processes

The math processes have straight consistent with each other. Problem solving and collaborating have the strongest value of many disciplines. Problem-solving method inspires students to analyses the focusing to a true way of concept analyses or be aware of the solving. When we make our students to well motivation in math thinking, we also to help them to make math analyzing, applying to formulas to new position, focusing on new different solution types and some approach evaluating with their friends, try to find new relation between the concept and problem situations. In this point to follow problem solving steps have vital important for the student's mental developments during the lecture. All difference approach coming from student need to be supported by the teacher to give them self-confidences. (Robert at all., 2005).

Problem solving

Problem solving is essential to learning math in the teaching and learning. It is considered an essential process through which students can accomplish the opportunities in math and is a main part of the math curricula. It is the main emphasis and area of math in the actual life and assistances students be self-possessed step by step. Also, problem solving tolerates students to practice the information in different areas and aids them link math with

conditions related the math subjects (<http://www.edu.gov.on.ca/eng/curriculum>). It is one of the main processes need to learn all math students carefully because of its power to understand mathematics more effectively. Students modificative math information's and gives sense to abilities by problem solving. It permits students to cause, transfer ideas, make contacts between math concept and other scientific disciplines. Original problems offer excellent opportunities for assessing students' understanding of math ideas, skill to apply concepts, definition, theorems and procedures. Moreover, this technique helps the cooperative division of thoughts and tactics. Finally, problem solving give opportunities students find entertainments in math and life.

Reasoning

Reasoning in teaching and learning helps students do true connection with math. Laboratory teaching in math lecture can continuously assist serious thoughtful. Another words, it is, a prepared, logical and balanced style to learning math thoughts, theorems and procedures. Moreover, the other name of making mathematics or a necessary tool to operate mathematics concepts, to understand the relation between mathematic concepts and the application of this subject the other scientific area

Students learn to service efficient mental operations, product oversimplifications built on explicit discoveries with their researches problems and deeply understanding of concepts when they analyses, explore and use estimations with math notions and relations.

Reflecting

The mean of reflecting math ideas or thinking's is a student frequently and intentionally reproduce his individual understood procedures. Also, we can explain this concept as one of main critical point for student to organize it correctly because of its nature Thus, he can identify at the time method he is consuming is not effective, and give correction to connect to another technique, reanalyzing the problematic situation, look connected information which could solution (<http://www.edu.gov.on.ca/eng/curriculum>). Their problem-solving abilities need to be reinforced at the time student replicate on other behaviors to achieve a problem that students not effectively finish the application. Focusing on the moderateness at a solution thinking the difficult and innovative problem has additional position that students could advance the skill to be aware of problems, also find solution for application studies about real life.

Computational tools

Students want to progress the math abilities at the choice suitable technological apparatuses, software applications, algorithmic approaches to accomplish specific math responsibilities. Another way of the meaning of this concept that doing mathematics with the all equipment, for example, all geometric materials or computer or some concrete box using the lecture Several kinds of tech materials are suitable at classroom and teaching. Students can practice computers and CPUs to large the volume and to check the dimensions studies to examine and analyse math concepts, to have different perspectives on concepts and to reduce the time on purely mechanical activities that is only repeating the same algorithms (<http://www.edu.gov.on.ca/eng/curriculum>).

The computer and other mechanical tools must be significant problem-solving tackles applied to for several aims of the program. They are materials of teachers and students could be presented chances to choice and practice the specific situations which could be supportive when students explore for the particular answers to difficulties or projects for real life.

Communication

This concept is the method of communicating math thoughts. As a social concept, it is important doing efficient mathematics between mathematicians or mathematic students or other students who are using mathematics concepts It is identifications verbally, concretely, choosing numbers, symbols, charts, symbols and all concept of math. Students connect with people from different culture for various purposes. communicating symbols figures is an important method in teaching and learning math. Over communicating, students could imitate and make clarify thoughts, thinking, relations, and math opinions for problems or concepts (Dalby and Noyes, 2015).

The advance of math language and representation make powerful students communicate abilities. Teachers need to be aware of the several students having different understanding and communication level which there is in the class to aid students to transfer. When this reason is valid, educators could explain appropriate practice of symbols and representations in all form of teaching (written or oral). They check precise form of math symbols and settlements in student studies. They ask clarifying problems and make motivation to students to make conversation with their teachers by asking some questions to make more energetic atmosphere in classroom (<http://www.edu.gov.on.ca/eng/curriculum>). Actual class connections need a special atmosphere that is given to all students in classroom feel relax at the time students talk about the math subject with the friends and the other school person as instructor.

Connecting

Problem solving and applications which permit students to find correlations to understand in which way notions are connected to each other's. This support the notion to hold main math concept, definitions and theorems. connecting at the time students to type this type of contacts in their studies, students start to understand math is connect and use together all of the math concepts and ideas and notions and that students could practice their understanding and skills at mathematics from which one concept to another one. Understanding the relations between mathematical steps, definitions, theorems and ideas give students' math thoughtful more powerful.

Result

At the time learners give explanations for the details of being students to vocational school, the central explanations at which coming the the examination had always been *it was always* been very interesting to be classroom and it is very important for me to develop my information and social position. Motivation to lecture discussions providing extra indication which many learners are involved in the vocational courses and appreciated the chance to choose the way of the school or learning.

The academic-vocational sections of the Turkish education system are evident in the student practice through differences in the aims of learning in vocational schools. Vocational education position is characterized by moving conditions and viewpoints as students came to central of engagement, for students in change from school to the work in real life. Connecting the differences and providing a conceptual, comprehensible, expressive and powerful knowledge of math learning for vocational school students needs an being aware of the change, an unusual method to math teaching and a mat class or matlab approach that replicates the standards of connecting to the conceptual context that are significant to for vocational students and teachers.

References

- Dalby, d., & noyes, a. (2015). Connecting mathematics teaching with vocational learning. *Adults learning mathematics: an international journal*, 10(1), 40-49.
- Ernest, p. (2004). Relevance versus utility. In b. Clarke, d. M. Clarke, g. Emanuaelson, b. Johansson, d. Lambin, f. Lester, a. Wallby & k. Wallby (eds.), *international perspectives on learning and teaching mathematics* (pp. 313-327). Goteborg: national center for mathematics education
- Hyland, t. (1999). *Vocational studies, lifelong learning and social values: investigating education, training and nvqs under the new deal*. Aldershot: ashgate.
- Roberts, c., gidley, n., eldred, j., brittan, j., grief, s., cooper, b., ... castillino, c. (2005). *Embedded teaching and learning of adult literacy, numeracy and esol: seven case studies*. Leicester: niace.
- Wenger, e. (1999). *Communities of practice: learning, meaning and identity*. Cambridge: cambridge university press
- Yüksel, s. (2002) örtük program. *Eğilim ve bilim dergisi*, cilt 27, sayı 126, sayfa: 31-37.
- <http://www.edu.gov.on.ca/eng/curriculum/secondary/math11curr.txt>. Ministry of education of canada. (2005). *The ontario curriculum grades 9 and 10. Mathematics*

Maths And Programming Project: Developing Mathematical Knowledge With Programming In Middle School

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Abstract

In the curriculum of the Italian secondary school, in the last decade, there has been a renewed interest in the practice of programming, also due to the recent national reforms based on the recommendations of the European Parliament in 2006.

The Maths and Programming project was born with the intention of encouraging the exploration of concepts and properties typical of mathematics through the use of programming. Research literature in mathematics education has shown how the practice of programming helps students develop reasoning, intuition and problem-solving skills. In this perspective, this paper presents the general lines of the project and a didactic activity realized in a first-year Middle school class (age 11-12 years) through the practice of programming using Python programming language.

Introduction

Computer programming is perceived as an important competence for the development of problem-solving skills in addition to logical reasoning. Hence, its integration throughout all educational levels is considered valuable and research studies are carried out to explore the phenomenon in more detail.

High-level thinking and problem-solving skill are requirements of computer programming that most of the students experience problems with. Individual differences such as motivation, attitude towards programming, thinking style of the student, and complexity of the programming language have an influence on students' success at programming (Yağci, 2016). In Italian Middle school, for most students the formal methods of mathematics remain forever mysterious, artificial, poorly motivated, and very obscurely related to intuitive thinking. The teaching of programming languages as a regular part of curriculum study can contribute effectively to reduce formal barriers and to enable students to access an accurate understanding of some key mathematical concepts. In the field of heuristic knowledge for technical problem solving, experience of programming is no less valuable: it lends itself to promote a discussion of relations between formal procedures and the comprehension of intuitive problem-solving and provides examples for the development of heuristic precepts (formulating a plan, subdividing the complexities, etc.). The activity of programming thus fosters an experimental approach toward solving problems; the use of a programming language provides students with a natural framework, a standard vocabulary, and a set of personal experiences for discussing mathematics. This is a great educational benefit – the mathematical thinking of students at all levels is seriously impeded by their inability to verbalise their mathematical experiences (Feurzeig, et al., 2011). Programming is a creative act that does not stop at the intuition of an idea, but expresses a constructive process that is expressed in the algorithm.

The ability to develop algorithmic solutions and to express them in a rigorous manner so as to be able to entrust the execution to a machine - computational thinking - deserves greater attention in the training of future adults as it forms the basis for a conscious use of technology and for profoundly understanding the computational aspects of reality. For these reasons, in Italy, the CINI consortium (Consortio Interuniversitario Nazionale per l'Informatica - National Inter-university Consortium for Computer Science) has developed a 'Proposal for National Guidelines for the teaching of Computer Science in the School' (<https://www.consortio-cini.it/index.php/it/component/attachments/download/745>) on the basis of the National Guidelines, highlighting the need to introduce the IT approach to problem-solving from the first school moments.

At the same time, the MIUR (Ministero dell'Istruzione, dell'Università e della Ricerca - Ministry of Education, University and Research) is preparing a syllabus of Digital Civic Education (http://www.generazioniconnesse.it/site/_file/documenti/ECD/ECD-sillabo.pdf) also in light of the National Plan for Digital Education (PNSD - http://www.istruzione.it/scuola_digitale/index.shtml) which introduced computational thinking in schools in order to bring students closer to the basic principles of Computer Science in a playful context (Coding).

The practice of Coding allows for the achievement of two objectives: learning through programming and

developing the habit of solving more or less complex problems. In this perspective, Coding can be included in all the disciplinary teaching activities for each school moment. The policy conducted by the Italian Minister of Education is in line with that of the European Commission which drafted the Digital Education Action Plan (<https://ec.europa.eu/education/sites/education/files/digital-education-action-plan.pdf>), with the goal that by 2020 at least 50% of European schools would take part in Europe Code Week, the campaign for the diffusion of computational thinking (Klopfenstein et al., 2018). As a result, in the last three years the number of Italian teachers who use coding in the classroom has grown through appropriate programming environments.

This paper introduces the essential parts of the Maths and Programming project aimed at the construction of mathematical knowledge through the use of the Python programming language. The main objective is to develop in students the ability to model problems and design algorithms. Specifically, the authors present an educational activity, realised within the project, with students aged 11-12 years. The activity is focused on the construction process of the algorithm for the calculation of the quotient from natural numbers, starting from a real problem.

Theoretical Framework

Today's digital landscape includes a diverse set of software and applications capable of supporting all sorts of mathematical activity. Nonetheless, programming has remained a significant part of science, technology, engineering, and mathematics related disciplines, where professional work often involves not just the use of existing digital tools, but also the creation of new and/or more adequate computer programs. This is just one reason why programming has recently regained the attention of politicians, curriculum developers, and researchers worldwide, who envision it as having potential both within and beyond classrooms (Broley, Caron, & Saint-Aubin, 2018).

In the last thirty years, several studies have been directed to the investigation and analysis of the role and effects of the use of technology in teaching and learning of Mathematics at the cognitive level (Bishop-Clark, 1995; Costabile, & Serpe, 2012; Goos, et al., 2003; Lesmeister, 1996; Quesada, & Maxwell, 1994; Lye, & Koh, 2014; Weber, 1998). In particular, the value of the programming in educational and pedagogical terms has been recognised internationally (Aydin, 2005; Costabile, & Serpe, 2013; Dubinski, & Tall, 1991; Kuzler, 2000; Liao, & Bright, 1991; Oprea, 1988; Pea, & Kusland, 1984). Programming is more than just coding, for, it exposes students to computational thinking which involves problem-solving, as well as using computer science concepts like abstraction and decomposition.

Wiedenbeck & Ramalingam (1999) defined programming as a process which includes a variety of cognitive activities, and mental representations related to program design, program understanding, modifying and debugging. In addition, Bayman & Mayer (1988) specified that programming involves syntactic, conceptual and strategic knowledge. The syntactic knowledge includes the programming languages' specific facts and rules; conceptual knowledge concerns programming structures and principles; and strategic knowledge is related to applying general problem-solving skills (Çakiroğlu, 2013).

The importance of programming since the early years of schooling has also been stressed (Clements, & Gullo, 1984; Clements, 1990; Clements, & Meredith, 1993; Fessakim, et al., 2013). Furthermore, the curriculum of mathematics has given an increasing emphasis on problem solving processes, indicating didactic problems of an intentional and functional nature as the educational goals to be achieved, in terms of knowledge, skills and abilities (National Council of Teachers of Mathematics, 2000). However, in recent years, there has been renewed interest in introducing programming into teaching because it is a cognitive and constructive activity.

Hatfield (1984) had already highlighted the pedagogical value of programming by detecting the existence of strong links between the thought processes that are triggered in students when they design and/or write computer programs and aspects related to mathematical thinking. Even Papert (1980) emphasised the fact that the construction of a program is configured as the construction of knowledge and, above all, warned about the use of 'pre-packaged' programs that inhibit creativity and a sense of discovery in the learner. Similarly, Bork (1981) associates 'computer programming as a vehicle for ... training ... analytic thinking applicable to broad classes of problems' and Nickerson (1982) states that we can see 'computer programming as a vehicle for teaching thinking skills'. Students only learn when they get the chance to construct their own knowledge and re-elaborate previous knowledge. In Mathematics education, computer programming allows the learner to develop new ideas and become familiar with them, and handle mathematical objects in an informed way as a result. The use of a programming environment in the classroom promotes a shift from concrete to abstract learning, and from the iconic to the symbolic (Kelly, 1984) so strengthening rational thinking.

Computer programming has been described by Nickerson (1982) as a creative endeavour that requires planning, accuracy in language use, generation and testing of hypotheses, and ability to identify action sequences. It ought to represent a fundamental part of the literacy for twenty-first century citizens (Rushkoff, 2010) as it is now a skill required for most jobs and spare time activities. While this is certainly true, one should not forget the psychological perspectives of computing in Mathematics (Hatfield, 1984).

The basic principle underlying the practice of programming in the classroom is that students can use the computer as a Mathematics laboratory in which to experiment (Howe, et al., 1989). Devising a program creates the

opportunity for experimenting by operating a cognitive shift in focus from procedures to their effects.

This kind of learning experience develops problem-solving skills. Feurzeig, et al. (1969) - the first to propose the practice of programming in the teaching of Mathematics in the classroom - believed that a programming language would provide an excellent environment for students to explore Maths and provide an ideal context for the understanding of problem-solving steps.

Programming gives the opportunity to organize, produce, understand and establish processes and procedures in order to plan, design and build computer prototypes of objects; translated in terms of student skills this means the learners can acquire intellectual education in all its components (logical, intuitive, creative and imaginative) and capacity for abstraction and modelling to solve real-world problems. Problem-solving is one of the skills employed in the learning of a programming language (Gundarao, Manjunath, & Nachappa, 2010). One needs to develop good problem-solving skills in order to learn how to write a successful computer program (Gundarao, Manjunath, & Nachappa, 2010). Gomes and Mendes (2007) also state that it is necessary for learners to develop good problem-solving skills in order to learn to program.

Maths And Programming Project

The use of programming in school favours the development of high levels of mathematical thinking in relation to numerical aspects related to reasoning, abstraction and problem-solving skills (Clement, 2000). More recently, attention has been paid to defining computational thinking (Wing, 2008), which is seen as part of a family of different aspects of mathematics thinking (Wing, 2008).

Maths and Programming is a one-year research project involving a class of 29 students, aged between 11 and 12 from a secondary-middle school in Calabria (Italy). Divided over a time frame of 40 hours, the project was initially linked to computational thinking to then give ample space to some key concepts of Mathematics emphasised through the programming activity. Specifically, in the first part of the project the students acquired the basics of programming and the general syntax of the Python language; in the second part, on the other hand, they refined the conceptualisation of what had been learned through the structuring of specific algorithms for the resolution of real problems related to basic arithmetic.

The project aims to facilitate the understanding of the concrete-abstract relationship, in order to avoid the acquisition of purely theoretical mathematical concepts in arithmetic with the use of programming.

The procedures of the project were framed around four phases.

- Administration of a pre-test to the students, aimed at exploring the students' knowledge in relation to some arithmetic concepts and students' ability in problem solving. The learning activities are planned based on the results of the pre-test.
- Introduction to basis of programming languages Python.
- Creation of didactic activities, further divided into various dates, supported by the use of Python programming languages.
- Administration of the post-test to the students, which consisted of questions concerning the resolutions of some real arithmetic problems.

The didactic activities were designed for the project based on the learning model in Figure 1 (Frassia, 2018).

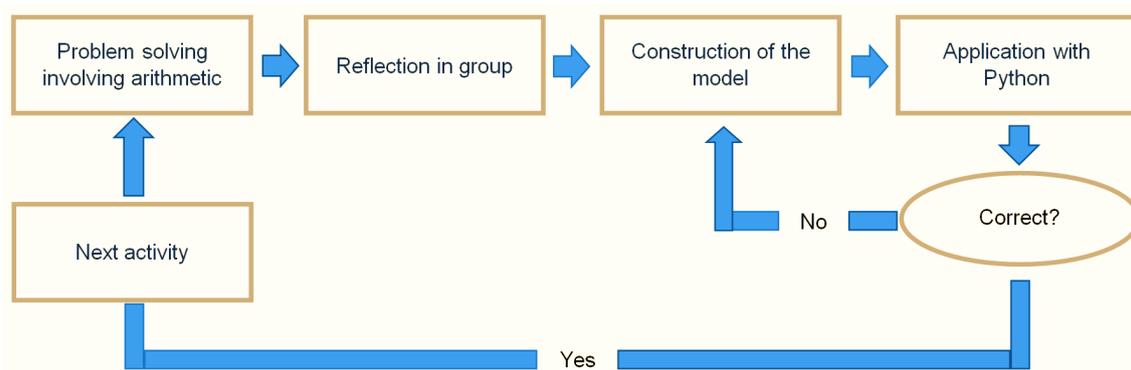


Figure 1: Learning model.

The phases of the teaching activity are explained below in more detail:

Problem-solving involving arithmetic: The learning activity starts by posing a problem in the context of daily life so as to make it meaningful to the students.

Reflection group: A careful reading of the text is followed by a discussion guided by the teacher on questions about the problem. A whole class discussion managed by the teacher includes interaction and communication with the students. As well as being an active, positive and collaborative exchange, this phase is essential for the continuation of the activity and allows all students to reflect on their own ideas.

Construction of the model: The construction of the model requires the students to reproduce some aspects of reality in order to analyse and study them. In this context, the algorithm represents the model. Moving from the experience to the construction of the meaning requires the construction of a simple algorithm to solve the situation proposed.

Application with Python programming language: The model is made explicit and reviewed in a logical sequence thanks to the algorithm; furthermore, the use of a programming environment, like Python, adds value because it helps the students to reinforce their skills in handling mathematical language. The construction of the algorithm is an important and delicate phase because the students have to design the 'finite sequence of steps' that allows the computer to get to the solution or to highlight the need for further study. Moreover, programming is a constructive and cognitive activity as it allows the student to acquire skills, strategies and techniques to solve problems using the concepts of variable, procedure, repetition and recursion, which are transversal concepts linked to other school subjects (Frassia, 2014; Serpe, & Frassia, 2017). The pedagogical-educational value of programming is internationally recognized (Pea, & Kurland, 1984); especially in the Informatics Education Report - ACM Europe (<http://europe.acm.org/iereport/>) the strategic role of this practice that today forms the basis of scientific progress is emphasized. Consequently, the programming cannot and must not be neglected in the teaching and learning of mathematics because it helps to form and enrich the technical, scientific and cultural development of young people. The practice of programming, then, becomes a useful mental training exercise, allowing at the same time the effective resolution of problems or simulation of reality. The teaching practice takes advantage of this game-like activity intended as a "space of knowledge" that allows students to formulate precise questions, record their thoughts, and, therefore, leads them to the formulation of a common synthesis (Frassia, 2015). Aspects of reality, then, are reconfigured to be analyzed and studied through the computer, as a program tool.

The results of pre-test highlight the following students' difficulties:

- in reading and understanding problem;
- they do not recognize data;
- they are not able to reorganizing strategy and solving problem;
- they are not able to confirm of the answer and process.

But, they don't have any difficulty in the operation's (addition, subtraction, multiplication and division) mechanism, that is, the students are able to correctly execute the algorithms of the four fundamental operations. Based on the results of the pre-test and following the learning model, five learning activities were designed (Table 1).

Didactic activity	Learning topics
One	Problem-solving involving addition.
Two	Problem-solving involving subtraction.
Three	Problem-solving involving multiplication.
Four	Problem-solving involving division.
Five	Problem-solving involving four basic operation.

Table 1: Learning topics.

This paper will now concentrate only on the fourth activity.

A Didactic Activity Of Maths And Programming Project

In this section, we report on the fourth learning activity about problem-solving involving division.

Initially, the teacher proposed to the students the following problem situation:

A group of three friends, always attentive to social issues, decided to collect the clothes they no longer wear and to give them to the voluntary associations in their city. None of them knows how many disused items of clothing he/she owns, but it is their intention to distribute them equally among the associations.

In relation to the clothes collected and the number of voluntary associations present in their city, how many items of clothing will each volunteer association receive?

In which case (s) will each voluntary association receive no garment?

In which case (s) will it not be possible for the three friends to realise their purpose?

The teacher engaged in a discussion on the data in the context of the introduced problem. This conversation triggered and guided by the teacher is very important because it avoids the construction of formal games, and educates to a reasoned exposition of conjectures and hypotheses, stimulating creativity, intuition and imagination. The students divided into 6 groups (5 groups of five and 1 group of four) by the teacher reflect about the text of the problem and begin to formulate some hypotheses. Some of the recorded comments between the teacher (T) and students (S1, S2, S3, S4, S5) in group 1 are reported below:

S1: We must divide the number of garments collected by the number of voluntary associations.

S2: But we do not know this.

- T: How can we continue without these data?
 S2: Do we invent them?
 S3: We must make hypotheses and then generalise.
 S2: For example, if the three friends collect 20 garments and there are 2 voluntary associations, they will be able to distribute 10 garments to each association.
 T: And if there were 16 items of clothing and 3 voluntary associations, how would the clothes be divided?
 S1: (With the calculator) 16 divided by 3 equals 5.33333
 T: Can we accept this solution?
 S3: We cannot accept it, because we cannot have a decimal number of garments.
 T: So what?
 S3: Each association will receive 5 garments and the three friends will have one left over.
 T: If the number of garments was 6 and that of associations 11?
 S1: It cannot be done because the first number (the dividend) is smaller than the second (the divisor).
 T: Do you all agree? Think about the case where 3 slices of cake are left and there are five of you, if you decide to eat them only if there is an equal number of slices per head, how many slices of cake will you eat and how many will remain?
 S5: We will not eat any and all 3 will be left over.
 S3: Then each association will have zero garments and 6 will remain.
 T: Let's consider another case: if the number of garments is 7 or any other positive natural number and the number of associations is zero, what happens?
 S2: That makes 7 or the number of garments.
 T: 7 is the result of which operation? Explain this better.
 S2: 7 divided by 0.
 T: If there are no voluntary associations, can the collected garments be divided?
 S4: No.
 T: So, what can we conclude about the division of a positive natural number by zero?
 S3: That division by zero is not possible.

At this point, the teacher proposes to schematise some of the predictable cases so as to give an answer to the initial problem and then put in a table. The following is an example (Table 2).

N. of garments	N. of associations	N. of garments per association
4	2	2
11	3	3
27	4	6
0	5	0
13	0	Not possible

Table 2: Scheme.

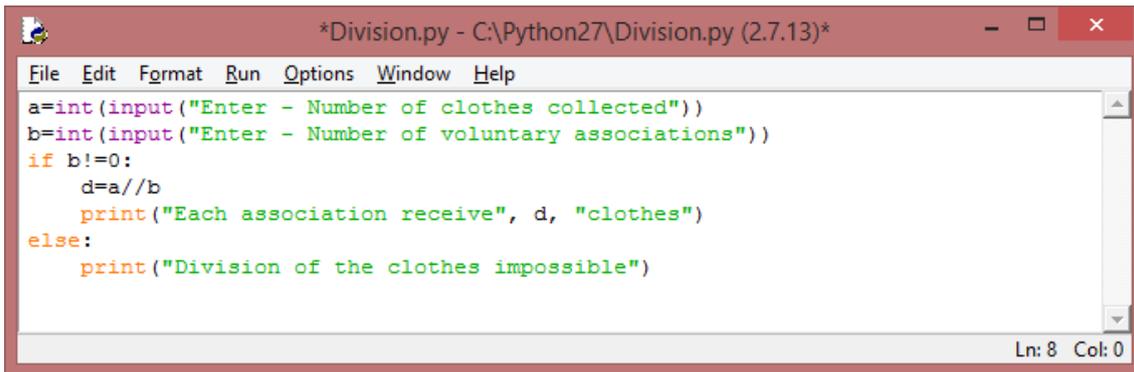
At the end of this point, the teacher asks each group of students to write the algorithm that allows them to answer the question when the values related to the number of garments and the number of voluntary associations changes. The ability to think in algorithms and procedures is promoted as an important learning goal in mathematics. Algorithmic thinking describes students' ability to work with algorithms understood as systematic descriptions of problem-solving and construction strategies, cause-effect relationships, and events (Misfeldt, & Ejsing-Duun, 2015).

The steps of the algorithm related to the situation proposed are:

```

Input: a (Number of clothes collected)
       b (Number of voluntary associations)
Control: if (b ≠ 0)
          Calculate:  $d = a/b$  (whole division)
          Print: Each association will receive  $d$  clothes.
        else:
          print: Division of the clothes impossible.
  
```

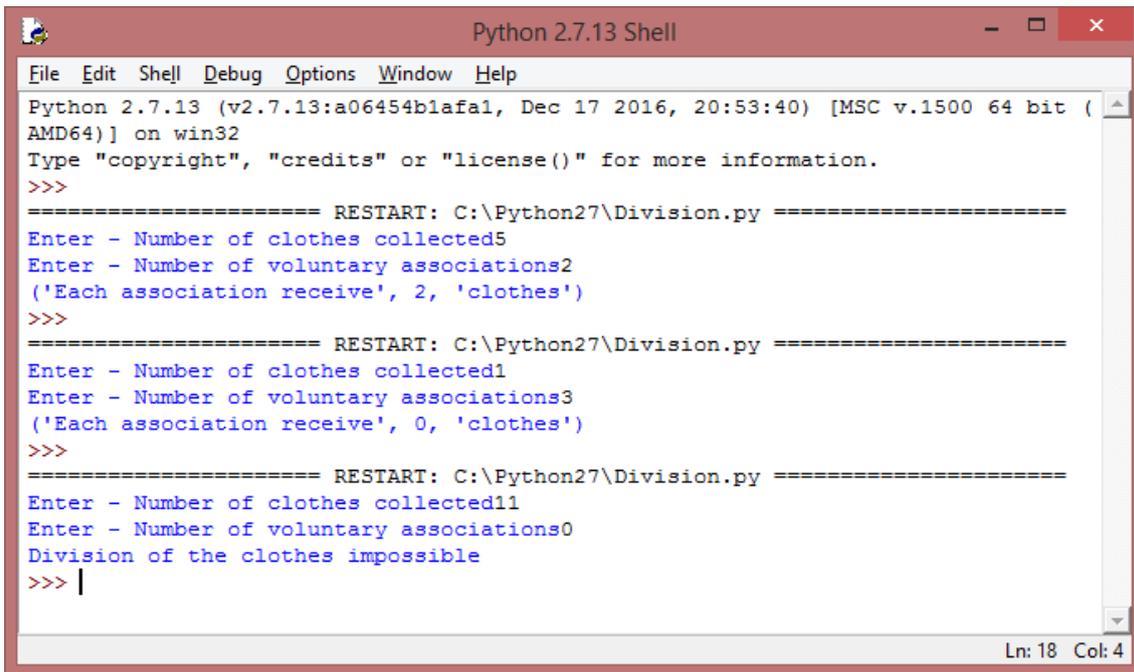
The implementation of the algorithm in Python programming language is as follows:



```
*Division.py - C:\Python27\Division.py (2.7.13)*
File Edit Format Run Options Window Help
a=int(input("Enter - Number of clothes collected"))
b=int(input("Enter - Number of voluntary associations"))
if b!=0:
    d=a//b
    print("Each association receive", d, "clothes")
else:
    print("Division of the clothes impossible")
Ln: 8 Col: 0
```

Figure 2: Code-Program to calculate the solution of the problem.

When the students run the program, they should see the following:



```
Python 2.7.13 Shell
File Edit Shell Debug Options Window Help
Python 2.7.13 (v2.7.13:a06454b1afa1, Dec 17 2016, 20:53:40) [MSC v.1500 64 bit (AMD64)] on win32
Type "copyright", "credits" or "license()" for more information.
>>>
===== RESTART: C:\Python27\Division.py =====
Enter - Number of clothes collected5
Enter - Number of voluntary associations2
('Each association receive', 2, 'clothes')
>>>
===== RESTART: C:\Python27\Division.py =====
Enter - Number of clothes collected1
Enter - Number of voluntary associations3
('Each association receive', 0, 'clothes')
>>>
===== RESTART: C:\Python27\Division.py =====
Enter - Number of clothes collected11
Enter - Number of voluntary associations0
Division of the clothes impossible
>>> |
Ln: 18 Col: 4
```

Figure 3: Output – Program to calculate the solution of the problem.

In the end, the students generalise the solutions to the problem:

- If $a < b$ each association received zero garments;
- If $b = 0$ it is not possible to divide the number of garments because there are no voluntary associations in the city;
- If $a > 0, b > 0, a > b$ each association will receive at least one item of clothing.

Conclusions

This study investigated qualitatively the effect of the process of learning to program on students’ problem-solving skills.

The results of the study showed that in mathematics learning to program did have a significant effect on students’ problem-solving skills.

After the didactic activities, the post-test was administrated. The result of the post-test are listed below:

- They are able to identification the data and the questions;
- They are able to make decision in the resolution of problem solving;
- They are able to make the operation (addition, subtraction, multiplication and division) between integer number in the correct context.

In Table 3, the authors report the initial and final observations made by the students:

Initial observation	Final observation
They believe that division between two natural numbers returns a single "number" - the quotient - and that this can be decimal.	They have become aware of the fact that division between natural numbers returns two integers: the quotient and the remainder.
They cannot contextualise the result of the division in a real situation.	They are able to contextualise the results obtained by the division in the real situation.
They believe that in the division the dividend must be greater than the divisor.	They have become aware that in the division the dividend may be smaller than the divisor.
They believe that a number (n) divided by zero (0) is equal to the number (n).	They have become aware of the fact that the division between a positive natural number and zero is not possible.
Few of them can identify the situation in which division can be applied.	Almost everyone can identify the situations in which the division is to be applied.

Table 3: Initial and final observation of fourth activity.

Ultimately, this type of activity provides students with additional conceptual tools to understand the logic and processes that underlie the resolution of real problems. The abstraction, organisation and precision efforts, characteristic of a mathematical activity assisted by programming, contribute to the development of critical thinking and allow students to create and acquire new skills, also ones that are transversal to other disciplines.

References

- Aydin, E. (2005). The use of computers in mathematics education: a paradigm shift from "computer assisted instruction" towards "student programming". *The Turkish Online Journal of Educational Technology*, 4(2), 27-34.
- Bayman, P. & Mayer, R.E. (1988). Using conceptual models to teach basic computer programming. *Journal of Educational Psychology*, 80, 291-298.
- Bishop-Clark, C. (1995). Cognitive style, personality, and computer programming. *Computers in Human Behavior*, 11(2), 241-260.
- Bork, A. (1981). *Learning with computers*. Digital Press, Bedford, Mass.
- Brolley, L., Caron, F., & Saint-Aubin, Y. (2018). Levels of Programming in Mathematical Research and University Mathematics Education. *International Journal of Research in Undergraduate Mathematics Education*, 4(1), 38-55.
- Çakiroğlu, Ü. (2013). Using a hybrid approach to facilitate learning introductory programming. *TOJET: The Turkish Online Journal of Educational Technology*, 12(1).
- Clements, D. H. (1990). Metacomponential development in a Logo programming environment. *Journal of Educational Psychology*, 82(1), 141.
- Clements, D. H., & Gullo, D. F. (1984). Effects of computer programming on young children's cognition. *Journal of Educational Psychology*, 76(6), 1051.
- Clements, D. H., & Meredith, J. S. (1993). Research on Logo: Effects and efficacy. *Journal of Computing in Childhood Education*, 4(4), 263-290.
- Clements, D. H. (2000). From exercises and tasks to problems and projects: Unique contributions of computers to innovative mathematics education. *The Journal of Mathematical Behavior*, 19(1), 9-47.
- Costabile, F.A., Serpe, A. (2012). MatCos: A Programming Environment for Mathematics Education. In G. Lee (Eds.), *Proceedings of the International Conference on Computer and Advanced Technology in Education* (Vol. 859971, pp. 25-30). Beijing, China, ICCATE 2011. New York: ASME Press: New York.
- Costabile, F.A., Serpe, A. (2013). Computer-Based Mathematics Instructions with MATCOS: A Pedagogical Experiment. In P.M. Pumilia-Ggnarini, & E. Pacetti (Eds). *Didactic Strategies and Technologies for Education: Incorporating Advancements* (pp. 724-738). Handbook of Research Vol. II., Cap. 63, IGI Global, Hershey, PA.
- Dubinsky, E., & Tall, D. (2002). *Advanced mathematical thinking and the computer*. In *Advanced mathematical thinking* (pp. 231-248). Springer Netherlands.
- Feurzeig, W., Papert, S., Bloom, M., Grant, R., & Solomon, C. (1969). *Programming languages as a conceptual framework for teaching mathematics*. Report N. 1889. Bolt Beranek & Newman Inc., Cambridge, MA.
- Feurzeig, W., Papert, S. A., & Lawler, B. (2011). Programming-languages as a conceptual framework for teaching mathematics. *Interactive Learning Environments*, 19(5), 487-501.
- Fessakis, G., Gouli, E., & Mavroudi, E. (2013). Problem solving by 5–6 years old kindergarten children in a computer programming environment: A case study. *Computers & Education*, 63, 87-97.
- Frassia, M.G. (2014). Esperienze di programmazione al computer: 'punti di vista' sul calcolo della probabilità. *Mondo Digitale*, 13(51), 726-735.
- Frassia, M.G. (2015). Games design with the programming environment MatCos for enhanced learning of

- probability theory: a didactic example for high schools. In L. GomezChova, A. LopezMartinez, & I. CandelTorres (Eds.), *EDULEARN15 Proceedings. International Conference on Education and New Learning Technologies* (pp. 1165-1172). Barcelona, Spain: IATED.
- Frassia, M.G. (2018). Enhanced statistical thinking in secondary school with python programming language: a realistic mathematics education approach. In L. GomezChova, A. LopezMartinez, & I. CandelTorres (Eds.), *INTED18 Proceedings. 12th International Technology, Education and Development Conference*. (pp. 3462-3471) Valencia, Spain: IATED. doi: 10.21125/inted.2018.0666
- Gomes, A., & Mendes, A. J. (2007) Learning to program – difficulties and solutions. *Proceedings of the 2007 international convergence on Engineering education*, September 3-7, Coimbra, Portugal.
- Goos, M., Galbraith, P., Renshaw, P., & Geiger, V. (2003). Perspectives on technology mediated learning in secondary school mathematics classrooms. *The Journal of Mathematical Behavior*, 22(1), 73-89.
- Gundurao, H. K., Manjunath, N. S., & Nachappa, M. N. (2010). *Computer Technology and Computer Programming*. Mumbai, IND: Global Media.
- Hatfield, L. L. (1984). Toward comprehensive instructional computing in mathematics. *Computers in mathematics education*, 1-9.
- Howe, J. A. M., Ross, P. M., Johnson, K. R., Plane, F., & Inglis, R. (1982). Teaching mathematics through programming in the classroom. *Computers & Education*, 6(1), 85-91.
- Lesmeister, L. M. (1996). The effect of graphing calculators on secondary mathematics achievement. (Unpublished MS thesis, University of Houston). *Dissertation Abstracts International*, 35, 01.
- Liao, Y. K. C., & Bright, G. W. (1991). Effects of computer programming on cognitive outcomes: A meta-analysis. *Journal of Educational Computing Research*, 7(3), 251-268.
- Lye, S. Y., & Koh, J. H. L. (2014). Review on teaching and learning of computational thinking through programming: What is next for K-12?. *Computers in Human Behavior*, 41, 51-61.
- Misfeldt, M., & Ejsing-Duun, S. (2015). Learning mathematics through programming: An instrumental approach to potentials and pitfalls. In Konrad Krainer; Nad'a Vondrová (Eds.), *Proceedings of the Ninth Congress of the European Society for Research in Mathematics Education*. (pp.2524-2530). CERME 9 - Ninth Congress of the European Society for Research in Mathematics Education, Feb 2015, Prague, Czech Republic.
- Kelly, A.V. (1984). Microcomputers and the curriculum: Uses and Abuses. In A.V. Kelly. (Ed), *Microcomputers and the Curriculum*. (pp. 1-19). London: Harper and Row.
- Klopfenstein, C. U. N. O., Delpriori, S., Paolini, B. D., & Bogliolo, A. (2018). X Marks the Bot: Online coding-based treasure hunt games for code literacy. In L. GomezChova, A. LopezMartinez, & I. CandelTorres (Eds.), *INTED18 Proceedings*. (pp. 4867-4873) Valencia, Spain: IATED.
- Kuzler, B. (2000). The Algebraic Calculator as a Pedagogical Tool for Teaching Mathematics. *International Journal of Computer Algebra in Mathematics Education*, 7(1), 5-23.
- Nickerson, R. S. (1982). Computer programming as a vehicle for teaching of thinking skills. *Thinking*, 4, 42-48.
- Oprea, J. M. (1988). Computer programming and mathematical thinking. *Journal of Mathematical Behavior*, 7(2), 175-190.
- Papert, S. (1980). *Mindstorms: Computers and Powerful Ideas*. New York: Basic Books.
- Pea, R. D., & Kurland, D. M. (1984). On the cognitive effects of learning computer programming. *New ideas in psychology*, 2(2), 137-168.
- Quesada, A. R., & Maxwell, M. E. (1994). The effects of using graphing calculators to enhance college students' performance in precalculus. *Educational Studies in Mathematics*, 27(2), 205-215.
- Rushkoff, D. (2010). *Program or be programmed: Ten commands for a digital age*. Or Books.
- Serpe, A., & Frassia, M.G. (2017). Computer-based activity's development for probability education in high school. *TOJET - The Turkish Online Journal of Educational Technology, Special Issue for INTE 2017 - October 2017*, 613-621. http://www.tojet.net/special/2017_10_1.pdf
- Weber, T. E. (1998). Graphing technology and its effect on solving inequalities. (Unpublished doctoral dissertation, Wayne State University, Detroit, MI). *Dissertation Abstracts International*, 60(01A), 88.
- Wiedenbeck, S. & Ramalingam, V. (1999). Novice comprehension of small programs written in the procedural and object-oriented styles. *International Journal of Human-Computer Studies*, 51, 71-87.
- Wing, J. M. (2008). Computational thinking and thinking about computing. *Philosophical transactions of the royal society of London A: mathematical, physical and engineering sciences*, 366(1881), 3717-3725.
- Yağci, M. (2016). Blended learning experience in a programming language course and the effect of the thinking styles of the students on success and motivation. *TOJET: The Turkish Online Journal of Educational Technology*, 15(4), 32-45.

Maths In-Service Teacher Training In The Italian National Plan For Digital Education - An Example Of Practice For The 21st Century

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Abstract

The growing impact of globalisation and the development of a 'knowledge society' have led many to argue that 21st century skills are essential for life in twenty-first century society and that to utilise technology is central to the development of these skills. Teachers need to be aware of what implications this has for teaching and learning strategies, as well as for the construct of their lesson presentation. A new approach to teaching practice, calibrated for the 21st century, requires teachers to use digital artefacts as an integral part of their teaching.

This paper describes an example of practice in the in-service teacher training programme for maths teachers of secondary school, within the Plan for Digital Education (*Piano Nazionale Scuola Digitale* - PNSD).

The authors' aim is to make participating teachers reflect on their own teaching praxis when using digital technology as an integrated part of their pedagogical content and at the same time to develop their own programmes for digital technology literacy to meet the teaching demands of the 21st century.

Introduction

"The Digital Agenda for Europe is one of the seven flagship initiatives of the Europe 2020 Strategy, set out to define the key enabling role that the use of Information and Communication Technologies (ICT) will have to play if Europe wants to succeed in its ambitions for 2020" (Digital Agenda for Europe, <http://ec.europa.eu/digital-agenda/>). For this reason, the Italian Government has adopted a series of reforms - in the labour market, in the education and innovation systems - aligned with international documents such as the Recommendations of the European Parliament and Council of Europe (<http://ec.europa.eu/citizenship/>), Framework for 21st Century Skills (<http://www.oecd.org/education/ceeri/>). The National Plan for Digital Education (*Piano Nazionale Scuola Digitale* - PNSD- <http://www.miur.gov.it/scuola-digitale>) is part of the broader programme initiated by the recent law reforming the education system, "La Buona Scuola" (Law 107/July 2015- <https://labuonascuola.gov.it/>), and is based on the following assumption: technologies should serve active learning for students and innovative practices for teachers, not vice versa.

The final goal is to give teachers and students a competitive advantage, such as classrooms and schools 'boosted' by the internet and technological devices. The plan is the steering document from the Ministry of Education, Universities and Research (Ministero dell'Istruzione, Università e Ricerca - MIUR) to launch a comprehensive strategy for promoting innovation in Italian schools; the purpose is to reposition the education system in the digital era. The plan consists of 35 actions which will be implemented up to 2020 and is in line with the Italian Digital Agenda strategy. Specifically, Action # 25 - In-service training for educational and organisational innovation - (http://www.istruzione.it/scuola_digitale/allegati/Applicativi/SmartGuide_PNSD_DM762_Docenti2016.pdf) is aimed at re-elaborating and adapting professional skills of teachers, not only on a purely instrumental level, but above all on a critical level in order that these teachers rethink their didactic activity in its entirety.

In this institutional framework, the Regional School Office (USR) of Calabria has launched the "PNSD on the Road" initiative dedicated to the promotion of training activities for all local schools, with particular attention to teachers who play the role of both digital animator and as 'part of a digital innovation team' (http://www.istruzione.calabria.it/wp-content/uploads/2016/03/PNSD-on-the-road_per-i-docent.pdf).

This required an open call - from the USR Calabria (regional MIUR) to experienced university researchers in order to follow up on targeted interventions aimed at designing good practices in the classroom with mathematical technologies, also with a view to enhance existing initiatives.

This paper describes an example of practice in the in-service teacher training programme for maths teachers of secondary schools in the province of Cosenza. The training action put in place by the authors, within the 'PNSD on the Road' was aimed at acquiring the knowledge of instructional strategies and representation to enhance the processes of mathematical modelling in the classroom with the use of technological tools intended as tools in service to teaching in a specific pedagogical framework. The paper is structured as follows: this introduction is followed by the theoretical framework and the design and development of one of the teaching practices developed within the training programme. The article finishes with some concluding remarks.

Theoretical Framework

In today's world it is important for students to develop lifelong learning skills, often referred to as a capacity of "learning to learn" (Anderson, 2008, p.19); many countries have implemented initiatives in education, in mathematics in particular, to respond to the challenges in acquiring these new skills - for the 21st century – which are creativity and innovation, communication and collaboration, research and information fluency, critical thinking, problem-solving and decision making, and digital citizenship and technology operations.

The skills cannot be taught in isolation, Voogt et al. (2013) argue that, "most frameworks recognise the complex and cross-disciplinary nature of 21st century competencies and thus recommend integrating them across the curriculum" (p. 407). In preparing for these skills, the appropriate use of technology by maths teachers in education is crucial. Roberts, Leung, and Lin (2013) comment on the complexity of the interplay between technology, mathematics, and education, noting that this complexity related to the use of tools in mathematics is not a phenomenon that is due to current technologies, but one that has been evident whenever people use tools in mathematics. The rapid development of digital technologies features new capabilities not even considered possible in the past. Today, different types of technology are available for teaching mathematics, and different technologies are appropriate for different purpose (Drijvers, et al., 2016). For example, technologies for communication, documentation, and presentation are essential in order to support the exchange of mathematical ideas. Mathematical technologies, such as spreadsheets, Computer Algebra Systems (CAS), Dynamic Geometry Software (DGS), and applet, enable teachers and students to investigate mathematical objects and connections using different mathematical representations, and to solve mathematical problems (Zbiek, et al., 2007).

In a balanced mathematics program, the strategic use of technology strengthens mathematics teaching and learning (Dick, & Hollebrands, 2011). Simply having access to technology is not sufficient. The teacher and the curriculum play critical roles in mediating the use of technological tools (Roschelle, et al., 2009); this implies a revision of pedagogical landscape in terms of the ways in which students engage in learning, and how understandings emerge. Programs in teacher education and professional development must continually update practitioners' knowledge of technology and its application to support learning. Waits and Demana (2000) argue that adoption of technology by teachers requires professional development that focuses on both conceptual and pedagogical issues, ongoing support in terms of "intensive start-up assistance and regular follow-up activities" and a desire to change from within the profession.

In Italia, the Ministry of Education, Universities and Research, for some time now, has adopted strategies to increase teachers' awareness in this direction by means of appropriate training courses that do not stop at the theoretical level, but are supported by tools to support practice and examples: there is nothing better than a good example to understand mechanisms and generate, by analogy, new ideas both in terms of teaching strategies and in relation to the effective use of teaching technologies.

Opening diverse ways for learners to construct and comprehend mathematical knowledge and to solve problems, calibrated for the 21st century, requires a new approach to teaching practice and calls for the reflections of the teachers on their own teaching praxis when using digital technology as an integrated part of their pedagogical content knowledge. Content-based activities using technology should address worthwhile mathematics concepts, procedures, and strategies, and should reflect the nature and spirit of mathematics. Activities should support sound mathematical curricular goals and should not be developed merely because technology makes them possible. Indeed, the use of technology in mathematics teaching should support and facilitate conceptual development, exploration, reasoning and problem-solving (Wilson, 2000). For example, the modelling activities do not compromise mathematical content and pedagogy because they help develop problem-solving skills and promote connections between the real world and the mathematical world (Stillman, et al., 2015).

Several research studies recognise that the development of technology creates more opportunities for practicing mathematical modelling in the classroom (Galbraith, et al., 2007); this has led to the promotion of modelling activities in schools (Lester, & Kehle, 2003; Stillman, et al., 2013).

In recent years, the practice of modelling with the use of technology has been fully included in the Mathematics school curricula (CAS, DGS, spreadsheets, programming environments, etc). Siller and Greefrath (2010) have implemented Blum and Leiss' (2007), modelling cycle introducing the world of technology (Figure 1).

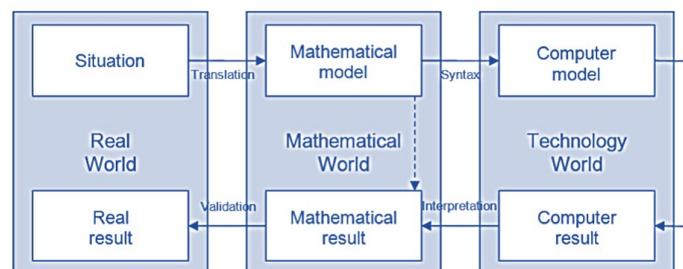


Figure 1: Extended modelling cycle – regarding technology when modelling.

The three worlds shown in Figure 1 are idealised and influence each other. For example, the development of a mathematical model depends on mathematical knowledge on the one hand, and on the other hand is influenced by the technology. The use of technology increases the chance to solve some mathematical models; in particular, the intelligent use of computers in teaching allows us to increase motivation on the one hand and to recognise the importance of mathematics in life on the other (Frassia, & Serpe, 2017). Unfortunately, many teachers prefer not to introduce modelling in classroom practice for different reasons, which include the lengthier learning process; at the same time, there are many reasons in favour of integration between modelling and technology (Siller, & Greefrath, 2010). In classroom teaching practice, the use of technology allows you to create new opportunities in the processes of teaching-learning and at the same time operate active links between the ideas and the mathematical content (Frassia, 2016). The use of technology can help to simplify the difficulties typical of some modelling procedures. Siller and Greenfrath (2010) identify some key elements when you engage in modelling activities with technology: computationally-intensive or deterministic activities; working or evaluating structuring of large data sets; visualising processes and results; experimental working.

Given this scenario, the authors illustrate an example of teaching practice for the 21st century relates to the content 'Elementary functions: basic tool for modelling'. The example emphasizes content and pedagogy, and not just software; in fact, the purpose of the authors is to prevent technology use from compromising mathematics and to encourage users to connect their experiential findings to more formal aspects of mathematics. In other words, technology should not influence students to take things at face value or to become what Schoenfeld (1985) referred to as "naïve empiricists."

An Example Of Teaching Practice

The math in-service teacher training, in the 'PNSD on the road', involved 50 secondary school teachers in a 12 hour course. According to Azione#25, the design of the teacher training programme has seen the development of mathematics teaching practices in such a way as to optimise the potential of technology to enhance students' understanding, stimulate their interest, and increase their proficiency in mathematics.

The choice of mathematical technology has fallen on the DGS GeoGebra because it is a software that teachers know very well from a technical point of view, but above all because it puts together the idea of a usability heuristic with a socio-constructivist learning perspective. The goal of the trainers is to point out that having a repertoire of heuristics does not automatically solve the central problem of "which" to use and "how", once you are faced with a specific problem. The teacher should not focus exclusively on the knowledge possessed (both in terms of basic mathematical knowledge and heuristic repertoire), but on "how" they must be used in order to provide the student with the opportunity to make meaningful and stimulating experiences and that are not limited to the execution of repetitive tasks. For example, the use in class of a DGS like GeoGebra widens the possibilities thanks to the following aspects of pedagogical usability:

- Encouraging student collaboration;
- Sequencing and sharing student work on mathematical task;
- Orchestrating mathematical discourse;
- Monitoring and assessing students' mathematical learning

should be considered along-side the technical aspects.

Based on these premises and in accordance with international research studies (Goos, et al., 2007, Doerr, & Pratt, 2008; Arzarello, et al., 2011), the maths in-service teacher has been oriented to the development of teaching practices related to elementary modelling in the classroom – with the use of GeoGebra – in such a way as to provide links from school-based learning to interdisciplinary themes that are essential to every student's ability to thrive as a global citizen. Students are able to discover ways to solve old problems and develop new ways of thinking about the world around them – a skill that is essential for the 21st century.

Mathematical modelling as an iterative problem-solving process that includes posing authentic, open-ended problems, making assumptions, identifying constraints and variables, building mathematical solutions and, finally, analysing and interpreting these solutions. It is iterative because once the initial solution is tested and translated back to the real world, revisions usually need to be made and the process continued until a satisfactory solution is reached and can be justified (Suh, et al., 2017).

In this perspective, the training action has privileged laboratory teaching in order to re-configure the knowledge to be taught in order to make it an object of investigation for the students and to favour the construction of mathematical ideas and meanings. In fact, the intention of the trainers is to bring the laboratory practice back to the centre as an essential meeting point between 'knowledge and know-how' also in the light of PNSD Action # 7, which designates the laboratory as a place of innovation and creativity where technology must combine tradition and the future, recovering practices and innovating them. Ultimately, a teacher training that sees the planning of laboratory activities, on the elementary mathematical modelling, as a means to improve the application of both the technical and pedagogical usability of the technology.

The teachers, provided with their own device (PNSD Action # 6 - Bring Your Own Device –BYOD), after having chosen the mathematical content must plan a real situation (Real-life problem) and develop it through the

modelling cycle (Fig.1) describing the different sub-processes of modelling with different levels of detail and emphasis. The implementation of this model encourages inductive reasoning while leaving plenty of opportunity for discovery. The simulation with GeoGebra software allows you to take stock of the situation and start again from what you know, to make appropriate considerations and understand why phenomena occur, and their implications. Specifically, the simulation represents a constructive and cognitive activity because it enables you to acquire skills, strategies and techniques for the solution of problems.

Now the authors describe an example of teacher practice on mathematical modelling of linear functions realised during in-service teacher training. In detail, the phases of the teacher training can be summarised as follows:

- 1) Theory-oriented competency (necessary knowledge about theoretical aspects of modelling such as knowledge about modelling cycles, goals and perspectives for modelling, types of modelling tasks).
- 2) Teaching competency (ability to formulate a real-life problem, micro- and macro-scaffolding abilities such as the ability to plan and perform modelling lessons and knowledge of appropriate adaptive interventions to enable students to work as independently as possible) and task-related competency (ability to solve a modelling problem, to analyse possible obstacles and necessary competencies, and to create modelling tasks on their own).
- 3) Diagnostic competency (the ability to identify phases in students' modelling processes and to diagnose students' difficulties during such processes in order to support students during their work and to select modelling problems).

In the first phase the teachers study, with the support of trainers, part of the existing literature on mathematical modelling also with the use of technology, focusing on the modelling cycle of Siller and Greefrath (Fig.1). Another fundamental theoretical pillar of analysis is the question concerning the formulation of a good real-life problem; in this sense, the principles proposed by Wedelin and Adawi (2015) for the design of problems related to real life have been a starting point, also providing ample space for discussion between teachers and trainers.

In the second phase the teachers are actively involved: divided into groups they must design problems related to real life, considering and hypothesising the sequence of actions to be recreated in the classroom and analysing the difficulties and skills required of the students. In this phase, the formulation of the text is fundamental as it must satisfy the principles of Wedelin and Adawi (2015). Below is the text of one of the problems created by a group of teachers, based on an experience in the classroom.

Problem of gym fees:

Anna and Maria received a scholarship of € 150.00 for their excellent academic performance. They decide, by mutual agreement, to allocate part of the amount for registration in the gym and the remaining part as a donation to a charity for the protection of the environment.

Anna and Maria do not live in the same neighbourhood, so they decide to enrol in two different gyms. Anna enrolls in a gym that requires the payment of a registration fee of € 30.00 and a weekly fee of € 10.00; instead the gym to which Maria enrolls requires a registration fee of € 20.00 and a weekly fee of € 12.00.

If Anna and Maria want to allocate the same amount to the charity, how many weeks can they attend the gym?

This example can be discussed under the aspect of different didactical principles:

- Graphical discussions (to draw a chart or diagram of the given situation, and/or modify a given chart with paper and pencil or DGS).
- Symbolic discussion (to describe the situation for both gym fees with the help of a function or functional dependency with paper and pencil or CAS).
- Numerical discussion (to compute date to solve problem with a scientific calculator or spreadsheet).

The various groups of teachers discussing the various methods and having at their disposal each their own device (BYOD) tend to favour the method that they usually use in the classroom also using the technology most familiar to them. Trainers point out to teachers that it is not important which method is chosen because in the classroom, when students are faced with a problem they tend to work on the basis of their experience and use methods familiar to them so that they can fulfil the task. Instead, it is important for student to see the different approaches for this problem.

This problem can be solved in completely different ways. It helps to uses the DGS because this provides the double possibility of translating the problem into the two registers (algebraic and geometric); in addition, by assigning variables - using sliders - the generalisation of the problem and its solution is obtained.

Looking to the modelling cycle by Siller and Greefrath (Figure 1), teachers must try to translate the steps which are necessary for solving the problem.

The hypotheses of the extended modelling cycle for the "Problem of gym fees" problem elaborated by the teachers are presented in Figure 2.

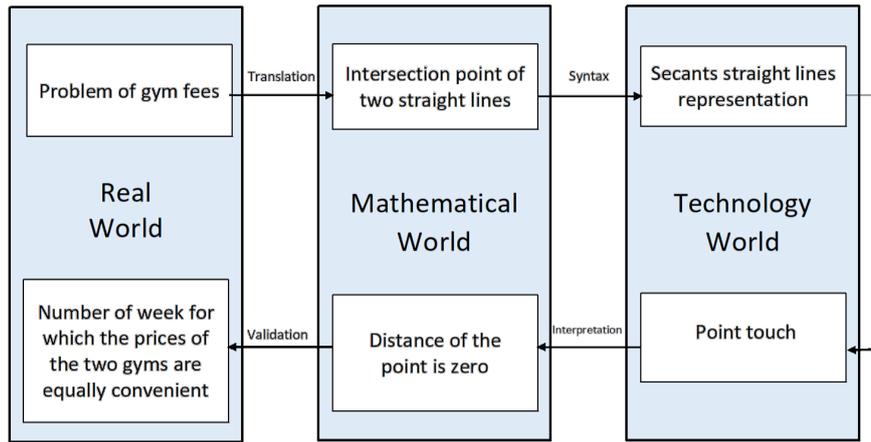


Figure 2: Extended modelling cycle for the “problem of gym fees”.

At this point the teachers retrace the model in Figure 2 step-by-step:

- Reading of the text and discussion aimed at identifying the data of the problem.
- Translation of the "Problem of gym fees" into mathematical language (determine the intersection point between two straight lines). This step requires the modelling process that determines the two payment fees (linear functions), offered by the two gyms:

$$y = 30 + 10x$$

$$y = 20 + 12x$$
- The syntax process allows a geometric representation in the Cartesian plane through modelling with the GeoGebra software (Figure 3).
- Solution of the problem in the world of technology (identification of the intersection point between the two straight lines represented in the previous step).
- Mathematical interpretation of the result obtained with GeoGebra (distance between two points belonging to the two straight lines).
- Validation of the mathematical solution in the real world.

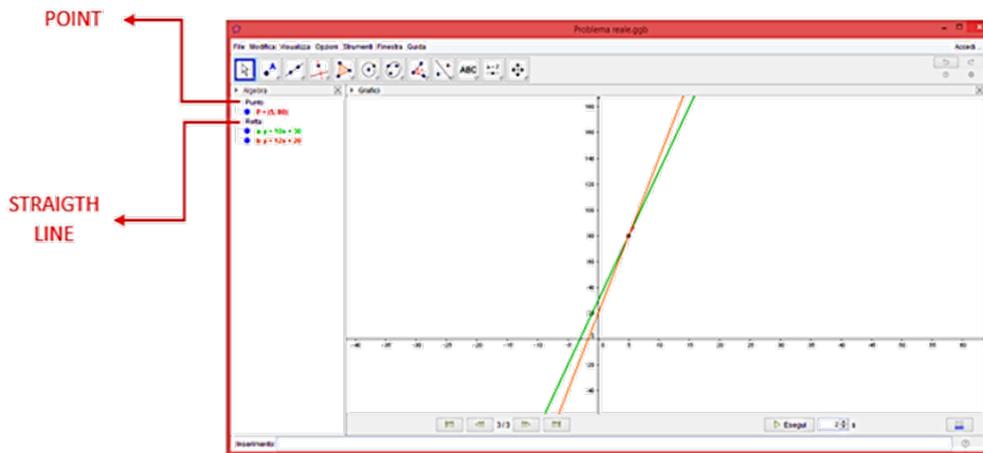


Figure 3. Output of the resolution of the “Problem of gym fees”.

In the third and final phase, teachers discuss the skills that students can develop in a process of mathematical modelling with the use of technology.

Specifically, with reference to Figure 4, the following skills are found:

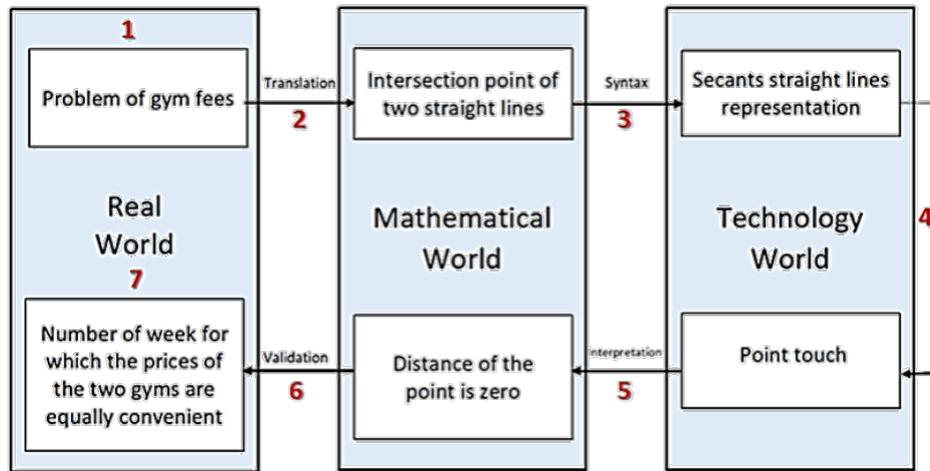


Figure 4: The extended modelling cycle for the “problem of gym fees”.

1. in understanding, analysing and structuring the real problem;
2. in the creation of a mathematical model through the language of the real world and in the use of mathematical content for the resolution of problems;
3. in the manipulation of variables of the mathematical model;
4. in the use of the IT tool;
5. in the interpretation of the results in the mathematical model;
6. on the reflection and validation of the model and in the interpretation of the mathematical results of the real situation;
7. in the communication of the model and its results.

Concluding Remarks

One of the fundamental points of this training activity was to insist on enlarging the methodological horizon, within which to frame the technological one. The task of the trainers was to make teachers reflect on the opportunities offered by mathematical technologies in order to select those that are useful for achieving the objectives set in the design of the various learning environments. Starting from the methodological choices, the teachers were able to grasp the importance of the transformation into the usual didactic practices, thus widening the options and the choice of the most effective strategies for the cognitive and motivational needs of the students. Within this framework the mathematical technologies should be included as "reagents".

Essential heuristic strategies for problem solving were used and encouraged in the work on modelling problems. In addition, modelling problems particularly encourage communicating and arguing. In teaching of mathematics, the use of applications and modelling is important because they promote different goals at various levels.

Due to the link between mathematics and reality, mathematical modelling offers the unique opportunity to get interesting impressions in the subject of mathematics as well as in real life. In this in-service teacher training, content-related, process-oriented, and general goals of modelling have been distinguished in order to underline the importance of mathematical modelling at different levels (Greefrath 2010; Niss et al. 2007).

The example of the practice presented shows how strategic intervention can be created, based on heuristic strategies and the role played by use of mathematical technologies in problem-solving activities.

In the in-service teacher training, the heuristic strategies can act as a conceptual toolkit to analyse the complexity of a modelling problem, identify the important steps in the modelling process, and pre-formulate possible strategic support.

In this scenario, the role of mathematical technology is many-fold because it can be generated and incorporate representations which can assist in transforming an indeterminate situation into a determinate one.

Mathematical technology also plays a central role in coordinating the inquiry, reasoning, and systematising that lead to a determinate situation.

The in-service teacher training that took place within the framework of the “PSND on the Road” has partially changed teachers’ attitudes towards the modelling problems. Indeed, the teachers they have overcome that initial reluctance and have worked with great enthusiasm thus widening their cultural horizons on the integration of meaningful and realistic contexts with the use of technology into mathematics.

In conclusion, the training action has increased teachers' awareness of the fact that technologies must be considered as tools available to teaching and as such they must be used within specific pedagogical models. This is in the belief that methodological and didactic innovation in digital learning environments (as foreseen by the European Framework for the Digital Competence for Educators - DigCompEdu <https://ec.europa.eu/jrc/en/printpdf/137812>) may have place in the school only through a re-elaboration and adaptation of the professional skills of the teachers, not only on a merely instrumental level, but above all on the critical level, so that they reach the ability to rethink their didactic activity in its entirety.

References

- Anderson, R. (2008). Implications of the information and knowledge society for education. In J. Voogt & G. Knezek (Eds.), *International handbook of information technology in primary and secondary education* (pp. 5–22). New York, NY: Springer.
- Arzarello, F., Ferrara, F., & Robutti, O. (2011). Mathematical modelling with technology: the role of dynamic representations. *Teaching Mathematics and its Applications*, 31(1), 20-30.
- Action #6 of PNSD - Linee guida per politiche attive di BYOD (Bring Your Own Device) <https://www.scuole-digitali.it/2016/07/29/le-35-azioni-del-pnsd-piano-nazionale-scuola-digitale/>
- Action #7 of PNSD - Piano per l'apprendimento pratico - <https://www.scuolaetecnologia.it/piano-nazionale-scuola-digitale/azione-7-atelier-creativi-piano-lapprendimento-pratico/>
- Action #25 of PNSD - Formazione in servizio per l'innovazione didattica e organizzativa - http://www.istruzione.it/scuola_digitale/allegati/Applicativi/SmartGuide_PNSD_DM762_Docenti2016.pdf
- Blum, W., & Leiss, D. (2007). How do students and teachers deal with mathematical modelling problems? The example "Filling up". In Haines et al. (Eds.), *Mathematical Modelling: Education, Engineering and Economics* (pp. 222-231). Chichester: Horwood, Publishing.
- Dick, T.P., & Hollebrands, K.F. (2011). *Focus in high school mathematics: Technology to support reasoning and sense making*. Reston, VA: NCTM.
- Digital Agenda for Europe. <http://ec.europa.eu/digital-agenda/>
- Doerr, H.M., & Pratt, D. (2008). The learning of mathematics and mathematical modeling. In M.K. Heid and G.W. Blume, (Eds.) *Research on technology and the teaching and learning of mathematics: Research syntheses*, (pp. 259-285). Information Age Publishing.
- Drijvers, P., Ball, L., Barzel, B., Heid, M.K., Cao, Y., & Maschietto, M. (2016). Uses of Technology in Lower Secondary Mathematics Education. In *Uses of Technology in Lower Secondary Mathematics Education* (pp. 1-34). Springer International Publishing.
- European Commission (EC). (2013). Survey of schools: ICT in education. <http://ec.europa.eu/digital-agenda/sites/digital-agenda/files/KK-31-13-401EN-N.pdf>
- European Framework for the Digital Competence for Educators - DigCompEdu <https://ec.europa.eu/jrc/en/printpdf/137812>
- Frassia, M.G., & Serpe, A. (2017). Learning geometry through mathematical modelling: an example with GeoGebra. *TOJET - The Turkish Online Journal of Educational Technology*, Special Issue for INTE 2017 - November 2017, 411-419.
- Framework 21st Century Skills. <http://www.oecd.org/education/ceeri/>
- Galbraith, P.L., Stillman, G., Brown, P., & Edward, I. (2007). Facilitating middle school modelling competencies. In C. Haines, P. Galbraith, W. Blum, & S. Khan (Eds.), *Mathematical modelling (ICTMA 12): Education, engineering and economics* (pp.130-140). Chichester: Horwood.
- Goos, M., Stillman, G., & Vale, C. (2007). *Teaching secondary school mathematics: research and practice for the 21st century*. Crows Nest, NSW : Allen & Unwin.
- Greefrath, G. (2011). Using technologies: New possibilities of teaching and learning modelling-Overview. In G. Kaiser, W. Blum, R. Borromeo Ferri, G. Stillman (Eds.), *Trends in teaching and learning of mathematical modelling*, ICTMA 14 (pp. 301–304). Dordrecht: Springer.
- La Buona Scuola (Law 107/July 2015) <https://labuonascuola.gov.it/>
- Lester, F., & Kehle, P. (2003). From problem solving to modelling: The evolution of thinking about research on complex mathematical activity. In R. Lesh, & H.M. Doerr (Eds.), *Beyond constructivism: Model and modeling perspectives on mathematics problem solving, learning and teaching* (pp.501-518). Mahwah, NJ: Erlbaum.
- Niss, M., Blum, W., & Galbraith, P. (2007). Introduction. In W. Blum, P.L. Galbraith, H.W. Henn & M. Niss (Eds.), *Modelling and applications in mathematics education*. The 14th ICMI Study (pp. 3–32). New York: Springer.
- Piano Nazionale Scuola Digitale (PNSD). <http://www.miur.gov.it/scuola-digitale>
- PNSD on the Road. http://www.istruzione.calabria.it/wp-content/uploads/2016/03/PNSD-on-the-road_per-i-docent.pdf
- Recommendations of the European Parliament and Council of Europe. <http://ec.europa.eu/citizenship/>
- Roberts, D., Leung, A., & Lin, B. (2013). From the slate to the web: Technology in the mathematics curriculum. In A. Bishop, M.A. Clements, C. Keitel, J. Kilpatrick, & F. Leung (Eds.), *Third international handbook of*

- mathematics education* (pp. 525–547). Berlin: Springer.
- Roschelle, J., Rafanan, K., Bhanot, R., Estrella, G., Penuel, W.R., Nussbaum, & M., Claro, S. (2009). Scaffolding group explanation and feedback with handheld technology: Impact on students' mathematics learning. *Educational Technology Research and Development*, 58, 399–419.
- Schoenfeld, A. (1985). *Mathematical problem solving*. New York: Academic Press.
- Siller, H.S., & Greefrath, G. (2010). Mathematical modelling in class regarding to technology. In V. Durand-Guerrier, S. Soury-Lavergne, & F. Arzarello (Eds.), *Proceeding of the Sixty European Conference on Research on Mathematics Education* (pp. 1150-1160). INRP. <http://www.inrp.fr/editions/cerme6>
- Stillman, G.A., Kaiser, G., Blum, W., & Brow, J.P. (Eds.) (2013). *Teaching Mathematical Modelling: Connecting to Research and Practice, International Perspectives on the Teaching and Learning of Mathematical Modelling*. Springer Science + Business Media Dordrecht.
- Stillman, G.A., Blum, W., & Salett Biembengut, M. (Eds.) (2015). *Mathematical Modelling in Education Research and Practice Cultural, Social and Cognitive Influences, International Perspectives on the Teaching and Learning of Mathematical Modelling*. Springer International Publishing Switzerland.
- Suh, J.M., Matson, K., & Seshaiyer, P. (2017). Engaging Elementary Students in the Creative Process of Mathematizing their World through Mathematical Modeling. *Educational Sciences*, 7(62), 1-21.
- Voogt, J., Erstad, O., Dede, C., & Mishra, P. (2013). Challenges to learning and schooling in the digital networked world of the 21st century. *Journal of Computer Assisted Learning*, 29, 403–413.
- Waits, B.K., & Demana, F. (2000). Calculators in mathematics teaching and learning: Past, present, and future. In M.J. Burke, & F.R. Curcio (Eds.), *Learning mathematics for a new century* (pp. 51-66). Reston, VA: National Council of Teachers of Mathematics.
- Wedelin, D., & Adawi, T. (2015). Applied Mathematical Problem Solving: Principles for Designing Small Realistic Problems. In *Mathematical Modelling in Education Research and Practice* (pp. 417-427). Springer International Publishing.
- Wilson, J. (2000). *Technologies in Secondary Schools*. <http://jwilson.coe.uga.edu/TiMER/TiMER.S.html>
- Zbiek, R.M., Heid, M.K., Blume, G.W., & Dick, T. (2007). Research on technology in mathematics education: A perspective of constructs. In F. Lester (Ed.), *Second handbook of research on mathematics teaching and learning* (pp. 1169–1207). Charlotte, NC: Information Age.

Mediator Role Of Motivational Self Talk In The Relation Of Life Satisfaction And Mental Toughness

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Abstract

The objective of this study is to examine the mediator role of motivational self-talk in the relation of life satisfaction and mental toughness. In line with the objective of the study, 199 athletes ($Age_{mean} = 20,30 \pm 2,526$), 110 of whom were females ($Age_{mean} = 20,09 \pm 0,277$) and 89 of whom were males ($Age_{mean} = 20,55 \pm 0,206$), volunteered to participate in the research, who were doing active sports in 2017-2018 season. Sport experience of the participants was calculated as $Year_{mean} = 6.07 \pm 3.70$. In order to reach the objective of the study, Life Satisfaction Scale, Self Talk Scale, and Mental Resilience Scale were used. In line with the objective of the study, in order to determine the relations among the variables, firstly correlation analysis was conducted. Pearson correlation coefficient necessitates both of the variables to be constant and to demonstrate a normal distribution together (dually). The interpretation of the r values, which are Pearson coefficients, were conducted as such; r values in between .00-.29 indicate low relation, while in between .30 and .69 they indicate mid-level relation, and in between .70 and 1.00 high-level relation (Büyüköztürk, 2008). Statistical significance level was accepted as .05. Moreover, the PROCESS macro regression analysis was used in order for the mediator role of the motivational self talk in between the life satisfaction and mental toughness. The analyses were conducted in 95 % confidence interval, and in order to test whether the mediator role was significant, Sobel z test was used. For the analyses of the research, SPSS 22.00 package program was used. When the findings of the research are examined, it can be stated that motivational self-talk has a positive mediator role in the predictor effect of life satisfaction on mental toughness. According to these results, it can be stated that one of the factors affecting mental toughness of the athletes is life satisfaction, moreover, with the mediator role of the motivational self-talk, the effect of life satisfaction increases on the mental toughness. Considering the positive effects, it is evaluated that life-satisfaction-increasing ones should be included in the mental-toughness-increasing activities, and that steps taken to increase motivational self-talk of the athletes might be effective in increasing their mental toughness.

Keywords: *Life Satisfaction, Motivational Self Talk, Mental Toughness.*

Introduction

Neugarten had first proposed the life satisfaction concept in 1961. Fundamentally, it is the condition, or the result, obtained by comparing the individuals' expectations (what one wants) and what they have at hand (what one has) (Özer and Karabulut, 2003). Subjective well-being and life satisfaction are described by many as the primary goals of life. Subjective well-being is closely related to how the individual assesses his or her life. It is suggested that the individual's life goals, the thoughts and the emotions of fulfilling these goals play a predictive role in achieving happiness and pleasure (Rask et al., 2002).

Life satisfaction is a subject in positive psychology issues that have been on the agenda in the sports and exercise environment for many years (Gaudreau & Antl, 2008; Ardahan, 2012; Toros et al., 2010; Özkara, Kalkavan & Çavdar, 2015; Şahin, Bayköse & Civar Yavuz, 2017; Kiliç, Bayköse & Kaplan, 2018; Guhn et al., 2018; Yıldız, Gülşen & Yılmaz, 2015; Yıldız et al, 2017).

The concept of mental toughness has recently become a topic that is on the agenda of researchers who are both in Turkey (Bayköse et al., 2017; Altıntaş & Koroç, 2017; Yarayan, Yıldız & Gülşen, 2018) and in other countries (Weinberg, Freysinger & Mellano, 2018; Thelwell et al., 2005; Jones et al, 2002; Bull et al., 2005; Clough et al., 2002). Although the concept of mental toughness, which is based on theoretical foundations by researchers many years ago (Kelly, 1955; Loehr, 1982), has been associated with positive and desired psychological features related to success (Jones et al., 2002), it is stated that specific themes are repeated in the current literature (Crust, 2007). Researchers and theorist defined mental toughness as coping with pressure and negativities in a way that performance will be least affected (Clough et al., 2002; Jones et al., 2002; Loehr, 1995; Middleton et al., 2004a; Williams, 1988), overcoming difficulties and failures with increasing determination to success (Clough et al.,

2002; Goldberg, 1998; Jones et al., 2002), refusing to give up and persevering (Goldberg, 1998; Gould et al., 1987; Middleton et al., 2004a), competing with oneself and others (Bull, Shambrook, James & Brooks, 2005; Clough et al., 2002), being stable and resistant (Bull et al., 2005; Clough et al., 2002; Goldberg, 1998; Gould et al., 2002), having a steadfast belief for self-determination (Clough et al., 2002; Jones et al., 2002; Middleton et al., 2004a), development through pressure (Bull et al., 2005; Jones et al., 2002; Thelwell et al., 2005), and having superior mental skills (Bull, Albinson, & Shambrook, 1996; Golby, Sheard, & Lavallee, 2003; Loehr, 1995).

One of the most common cognitive strategies used by athletes is self-talk. Self-talk is central to cognitive and cognitive-behavioral interventions and has recently become an important research topic in the field of applied sports psychology (Conroy & Metzler, 2004). Self-talk refers to the internal or external explanations that individuals make themselves and is defined as an internal dialogue in which individuals interpret perceptions and emotions, organize and change evaluations and cognitions, and instruct themselves (Hackfort & Schwenkmezger, 1993).

Initially, researchers have distinguished between two main dimensions of self-talk including positive and negative self-talk. Positive self-talk is defined as expressions requiring praise and courage, and negative self-talk is defined as criticism and self-concern (Moran, 1996). More contemporary approaches guide self-talk according to its purposes. Zinsser, Bunker, and Williams (2001) expressed self-talk as an instructional or motivational phenomenon. While instructional self-talk is related to the statements associated with focus, technical knowledge, and tactical options, motivational self-talk indicates the statements related to creating self-confidence, effort, and positive moods. Following the researches, Hardy and his colleagues (Hardy, 2006; Hardy, Hall & Hardy 2005) made a more comprehensive definition of self-talk. They have defined self-talk as a multidimensional dynamic phenomenon related to the words that come out of the athletes' mouth. In this study, Considering the theoretical approach put forward by Zinsser, Bunker and Williams (2001), the motivational dimension of self-talk will be examined. In line with this information, the following H1 hypothesis will be tested within the scope of the research. H₁= There is a mediation role of motivational self-talk in the influence of life satisfaction on mental endurance.

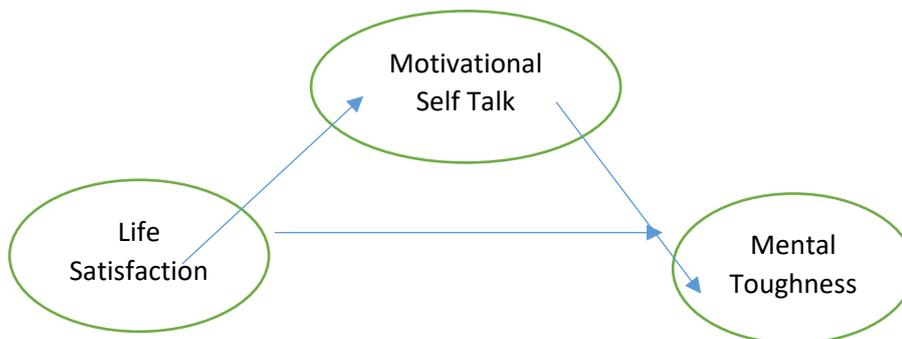
Method

Research Model

This study was a relational screening model designed to examine the mediation role of self-talk levels in the relationship between life satisfaction and mental toughness. Karasar (2009) defined the relational screening models as the research models aiming at finding out the existence and degree of covariances between two or more variables. In the scope of this model, the mediation role of self-talk levels in the relationship between life satisfaction and mental toughness was examined.

The hypothesized model was shown below;

Figure 1: Research Model



Research Group

110 females (Age_{mean}: 20,09 ± 0,277) and 89 males (Age_{mean}: 20,55 ± 0,206), totally 199 athletes (Age_{mean}: 20,30 ± 2,526), voluntarily participated in the study. The sports experience mean score of the athletes was Year_{mean}: 6.07 ± 3.70.

Data Collection Tools

To reach the research purpose, Life Satisfaction Scale, Self-Talk Questionnaire and Sport Mental Toughness Scale were used. The detailed information on the scales used in the research is given below.

The Satisfaction With Life Scale-SWLS

The Satisfaction with Life Scale, developed by Pavot and Diener (1993), was used. The Satisfaction with Life Scale was a scale developed to evaluate the respondent life in the aggregate. This scale is not for assessing the living area such as health or income but allows them to be integrated. The Satisfaction with Life Scale is a 7-Likert type scale.

It is a scale including 5 items rated as 7. Absolutely agree, 6. agree, 5. agree very little, 4. Undecided, 3. Disagree a little 2. Disagree 1. Absolutely Disagree (my life in many directions is close to ideal, my living conditions are

excellent, my life satisfies me, up to now, I have achieved the important things I want in life, If I had the chance to live my life again, I would hardly change anything). The highest score one can get from the scale is 35; the lowest one is 5; the higher the score in the scale, the higher the level of life satisfaction (Pavot and Diener, 1993). The scale was used in various fields (Yetim, 1991). Pavor and Diener found the reliability of the scale as $\alpha = 0.89$. In this study, the reliability of the scale was found to be $\alpha = 0.695$.

Self-Talk Questionnaire

The Self Talk Questionnaire was developed by Zervas, Stavrou & Psychountaki (2007) for use in sports and sports environments. Turkish adaptation was conducted by Engür (2011) in a sample of 422 college athletes (157 females and 265 males). Latent variables measured by item groups related to a theoretical model created by KKA hypothesizing that there were 11 items and 2 factors by Zervas et al. (2007) were tested by using CFA in LISREL 8.51. The model fit of χ^2 / df calculated as 165.74/38=4.36. The other fit indices were calculated as RMSEA = 0.089, SRMR = 0.037, GFI = 0.93, AGFI = 0.88, NFI = 0.96; NNFI = 0.96, CFI = 0.97[3]. For the reliability of self-talk scale, reliability coefficient for motivational function subdimension was 0.94 while the value for cognitive function subdimension was 0.87 (Engür, 2011; Zervas, Stavrou & Psychountaki, 2007)

Sport Mental Toughness Scale

In the study, the Sport Mental Toughness Questionnaire (SMTQ-14) developed by Sheard et al., (2009) was applied to determine the mental toughness level of athletes. 14-item sport mental toughness scale measure three different subdimensions (Confidence, Continuity, and Control) as well as general mental toughness. The scale is the 4-point Likert type (1=completely wrong, 4=Completely right). The Cronbach's alpha values of Sport Mental Toughness Questionnaire was found to be 0.81 for Confidence; 0.74 for Continuity; 0.71 for control (Sheard et al., 2009). The fit indices of the inventory that tested with the participation of 509 athletes having age mean of 20 years were found to be GFI=0.95, AGFI=0.93, RMSEA=0.05, RMR=0.05, CFI=0.92, IFI=0.93 (Sheard et al., 2009). The Cronbach Alpha values of the Sport Mental Toughness Questionnaire adapted to Turkish culture by Altıntaş & Koruç (2017), were 0.84 for the Confidence; 0.51 for Continuity; 0.79 for Control (Altıntaş & Koruç, 2017). The fit indices for the inventory was GFI=0.90, AGFI=0.89, RMSEA=0.07, RMR=0.04, CFI=0.91, IFI=0.91 (Altıntaş & Koruç, 2017).

Analysis

Within the scope of the research purpose, correlation analysis was first performed to determine the relationships between variables. The Pearson correlation coefficient requires that both variables are continuous and that the variables have a normal distribution (in pairs). The value r, which represents the correlation coefficient, has been interpreted as follows: the relationship is low between .00-.29, moderate between .30-.69, and high between .70 and 1.00 (Büyüköztürk, 2008). The significance level was accepted .05 statistically. PROCESS macro regression analysis was used for analysis, and analysis was performed at 95% confidence interval, the Sobel z test was used to test whether the mediation was significant. SPSS 22.00 program was used for the analysis.

Results

Correlations between variables

Table 1: The relationship between life satisfaction, motivational self-talk, and mental toughness

	Life Satisfaction	Motivational Self Talk	Mental Toughness
	r	1	
Life Satisfaction	p		
	n	199	
	r	,175*	1
Motivational Self Talk	p	,013	
	n	199	199
	r	,198**	,452**
Mental Toughness	p	,005	,000
	n	199	199

*. Correlation is significant at the 0.05 level (2-tailed).

**.. Correlation is significant at the 0.01 level (2-tailed).

When table 1 is examined, significant differences were found between life satisfaction and motivational self-talk (r: .175, p<0.05); life satisfaction and mental toughness (r: .198, p<0.05), and mental toughness and motivational self-talk (r: .452, p<0.05)

Research Model

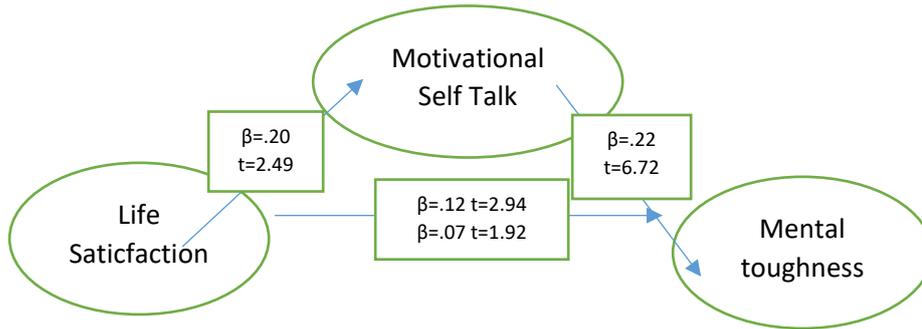


Figure 2: The mediation role of motivational self-talk of the athletes in the relationship between life satisfaction and mental toughness

The determination that there is a positive and significant correlation between life satisfaction and mental toughness allows testing the hypothesized mediation. PROCESS macro regression analysis was used to test whether motivational self-talk played a role in the relationship between life satisfaction and mental toughness. The predictive effect life satisfaction on motivational self-talk was examined in the first step of PROCESS macro regression analysis, and it was found that life satisfaction predicted motivational self-talk ($\beta=.20, t= 2.49, p<.05$) at the level of 3% ($R^2=.17, R^2=.03, F= 6,23, p<.05$).

In the second step of PROCESS macro regression analysis to determine whether motivational self-talk played a role in the relationship between life satisfaction and mental toughness, the predictive effect of life satisfaction on mental toughness was examined. When the results were examined, it was seen that life satisfaction ($\beta= .12, t= 2.94, p<.05$) predicted mental toughness at the level of 4% ($R^2=.19, R^2=.04, F= 8,06, p<.05$).

In the third step of PROCESS macro regression analysis to determine whether motivational self-talk played a role in the relationship between life satisfaction and mental toughness, motivational self-talk was included in the PROCESS macro regression analysis and found that it was seen that motivational self-talk contributed to the prediction of mental toughness at the level of 5%. Accordingly, it was found 22% of the total variances was explained via motivational self-talk in the prediction of mental toughness by life satisfaction ($R^2=.47, R^2=.22, F=27.54, p<.05$). In the third step of the analysis, it was observed that the effect of life satisfaction on mental toughness decreased ($\beta=.07, t=1.92, p>.05$). Thus, it can be said that motivational self-talk has a full mediation role in this relationship ($\beta= .22, t=-6.73, p<.05$). Sobel z test, used to determine whether the mediation role was significant, showed that the mediation relation was statistically significant ($Z= 2.32, p<.05$).

Table 3: The direct and indirect effects of life satisfaction on mental toughness

Direct Effect			Effect	S.E	LLCI	ULCI	t	p
Life Satisfaction	Mental Toughness		.074	.0383	-.0023	.1494	1.92	.050
Indirect Effect			Effect	S.E	LLCI	ULCI	t	p
Life Satisfaction	Motivational Self talk	Mental Toughness	.045	.0249	.0025	.1022	2.84	.000
Total Effect			.118	.0416	.0363	.2009		
Normal Theory Test for indirect effect								
Effect: .0487			s.e: .0195		z: 2.3181		p: .0204	

In table 3, it was found that total effect (direct + indirect) of life satisfaction on mental toughness was positive ($\beta= 0,074+0,045=0,118$) and statistically significant ($p=0,000$). Because the Z score (2,3181) of this model was higher than 1,96 and significant, the existence of a mediator effect can be said. According to this finding, H_1 (There is a mediation role of motivational self-talk in the influence of life satisfaction on mental endurance) was accepted.

Discussion And Conclusion

The direct and the indirect relationship between life satisfaction and mental toughness levels of the athletes were examined in this study. In line with the purpose of this study, 110 females ($Age_{mean}: 20,09 \pm 0,277$) and 89 males ($Age_{mean}: 20,55 \pm 0,206$), totally 199 athletes ($Age_{mean}: 20,30 \pm 2,526$), voluntarily participated in the study. The sports experience mean score of the athletes was $Year_{mean}: 6.07 \pm 3.70$.

When the results were examined, it was observed that the relationship between life satisfaction and motivational self-talk and the that between life satisfaction and mental toughness were significant. Furthermore, it was found that the relationship between mental toughness and motivational self-talk was significant.

The determination that there is a positive and significant correlation between life satisfaction and mental toughness allows testing the hypothesized mediation. PROCESS macro regression analysis was used to test whether motivational self-talk played a role in the relationship between life satisfaction and mental toughness. The predictive effect life satisfaction on motivational self-talk was examined in the first step of PROCESS macro regression analysis, and it was found that life satisfaction explained 3% of the total variances related to motivational self-talk. In this context, it can be said that increasing life satisfaction enhances motivational self-talk tendency. When the literature is examined, it is suggested that positive self-talk has a positive impact on performance and (Vab Raalte et al., 1995) and interrelated and correlated with many positive psychology dynamics (Neck & Manz, 1992).

In the second step of PROCESS macro regression analysis to determine whether motivational self-talk played a role in the relationship between life satisfaction and mental toughness, the predictive effect of life satisfaction on mental toughness was examined. When the results were examined, it was seen that life satisfaction explained 4% of the total variance related to mental toughness. In line with this information, it can be said that increasing life satisfaction contributes to mental toughness. As it is stated in the introduction, mental toughness concept can contribute to many positive components such as having a steadfast belief for self-determination (Clough et al., 2002; Jones et al., 2002; Middleton et al., 2004a), development through pressure (Bull et al., 2005; Jones et al., 2002; Thelwell et al., 2005), and having superior mental skills (Bull, Albinson, & Shambrook, 1996; Golby, Sheard, & Lavalley, 2003; Loehr, 1995), according to our results, it can be said that having a certain level of life satisfaction will provide support for mental toughness.

In the third step of PROCESS macro regression analysis to determine whether motivational self-talk played a role in the relationship between life satisfaction and mental toughness, motivational self-talk was included in the PROCESS macro regression analysis and found that it was seen that motivational self-talk contributed to the prediction of mental toughness at the level of 5%. Accordingly, it was found 22% of the total variances was explained via motivational self-talk in the prediction of mental toughness by life satisfaction. In the third step of the analysis, it was observed that the effect of life satisfaction on mental toughness decreased. Thus, it can be said that motivational self-talk has a full mediation role in this relationship. Sobel z test, used to determine whether the mediation role was significant, showed that the mediation relation was statistically significant. In line with these obtained results, it can be said that motivational self-talk mediates the relationship between life satisfaction and mental toughness. Based on the results, motivational self-talk can play a critical role in creating or increasing mental toughness studies.

Consequently, it is thought that individuals who want to contribute to the mental toughness of the athletes can benefit from motivational self-talk intervention programs as an intervention to increase their life satisfaction. Moreover, an intervention program for motivational self-talk can be developed and tested for efficiency by the researchers based on the views in literature in future studies.

Author Note

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References

- Büyüköztürk, Ş. (2008). Sosyal Bilimler İçin Veri Analizi El Kitabı. Ankara: Pegem Akademi Yayınları.
- Karasar, N. (2009). Bilimsel araştırma yöntemi (19. bs). Ankara: Nobel yayın dağıtım.
- Pavot, W. ve Diener, E (1993), "Review of the Satisfaction With Life Scale", Psychological Assessment, 5, 164-172.
- Yetim, Ü., (1991), Kişisel Projelerin Organizasyonu Açısından Yaşam Doymumu, Yayınlanmamış Doktora Tezi, İzmir: Ege Üniversitesi. Sosyal Bilimler Enstitüsü.
- Conroy, D., & Metzler, D. E. (2004). Patterns of self-talk associated with different forms of competitive anxiety. Journal of Sport and Exercise Psychology, 26, 69–89.
- Hackfort, D., & Schwenkmezger, P. (1993). Anxiety. In R. N. Singer, M. Murphy, & L. K. Tennant (Eds.), Handbook of research on sport psychology (pp. 328–364). New York: Macmillan.
- Moran, A. P. (1996). The psychology of concentration in sport performers. East Sussex, UK: Psychology Press.
- Zinsser, N., Bunker, L., & Williams, J. M. (2001). Cognitive techniques for building confidence and enhancing performance. In J. M. Williams, (Ed.), Applied sport psychology: Personal growth to peak performance (4th ed.; pp. 284–311). Mountain View, CA: Mayfield.
- Hardy, J., Hall, C. R., & Hardy, L. (2005). Quantifying self-talk. Journal of Sports Sciences, 23, 905–917
- Hardy, J. (2006). Speaking clearly: A critical review of the self-talk literature. Psychology of Sport & Exercise, 7, 81–97.
- Rask K, Astedt-Kurki P, Laippala P (2002) Adolescent subjective well-being and realized values. J Adv Nurs, 38: 254-263.
- Özer M, Karabulut ÖÖ (2003) Yaşlılarda yaşam doymumu. Geriatri, 6(2):72-74.

- Ardahan, F. (2012). Duygusal zekâ ve yaşam doyumunu arasındaki ilişkinin doğa sporu yapanlar örneğinde incelenmesi. *Pamukkale Journal of Sport Sciences*, 3(3), 20-33.
- Toros, T., Akyüz, U., Bayansaldüz, M., & Soyer, F. (2010). Görev ve ego yönelimli hedeflerin yaşam doyumunu ile ilişkisinin incelenmesi (Dağcılık sporu yapanlarla ilgili bir çalışma). *Uluslararası İnsan Bilimleri Dergisi*, 7(2), 1039-1050.
- Özkara, A., Kalkavan, A., & Çavdar, S. (2015). Spor bilimleri alanında eğitim alan üniversite öğrencilerinin yaşam doyum düzeylerinin araştırılması. *International Journal of Science Culture and Sport*, 3(Special Issue 3), 336-346.
- Şahin, A., Bayköse, N., & Civar Yavuz, S. (2017). The role of motivational self-talk and life satisfaction on determining the flow experience of undergraduate athletes. *Turkish Online Journal of Educational Technology*, (December Special Issue), 867-871.
- Kiliç, T., Bayköse, N., & Kaplan, K. (2018). Comparing the Life Quality of the Students in the Faculty of Sports Sciences and the Faculty of Education. *Journal of Education and Training Studies*, 6(8), 116-122.
- Yıldız, A. B., Gülşen, D. B. A., & Yılmaz, B. (2015). Sporcuların Optimal Performans Duygu Durumunun Yaşam Tatminleri Üzerindeki Etkisi. *Niğde University Journal of Physical Education And Sport Sciences (Special Issue) Vol 9*, 58-64.
- Guhn, M., Ark, T. K., Emerson, S. D., Schonert-Reichl, K. A., & Gadermann, A. M. (2018). The Satisfaction with Life Scale adapted for Children: Measurement invariance across gender and over time. *Psychological assessment*.
- Gaudreau, P., & Antl, S. (2008). Athletes' broad dimensions of dispositional perfectionism: Examining changes in life satisfaction and the mediating role of sport-related motivation and coping. *Journal of Sport and Exercise Psychology*, 30(3), 356-382.
- Yıldız, M., Bingöl, E., Şahan, H., Bayköse, N., & Senel, E. (2017). A Cross-Cultural Approach to Sport Psychology: Is Exercise Addiction A Determinant of Life Quality?. *Sport Journal*. 1-10.
- Bayköse N., Civar Yavuz, S., Özer, Ö., & Şahin, A. (2017). The role of self-talk and self-efficacy levels of athletes studying at faculties of sport sciences on predicting mental toughness. *Turkish Online Journal of Educational Technology*, (December Special Issue), 591-595.
- Altıntaş, A., & Koruç, B. K. (2017). Sporda zihinsel dayanıklılık envanteri'nin psikometrik özelliklerinin incelenmesi. *Spor Bilimleri Dergisi Hacettepe Journal of Sport Sciences*, 27(4), 162-171.
- Yarayan, Y. E., Yıldız, A. B., & Gülşen, D. B. A. (2018). Examination of Mental Toughness Levels of Individual and Team Sports Players at Elite Level According to Various Variables. *The Journal of International Social Research*. 11 (57), 992-999.
- Weinberg, R., Freysinger, V., & Mellano, K. (2018). How can coaches build mental toughness? Views from sport psychologists. *Journal of Sport Psychology in Action*, 9(1), 1-10.
- Crust, L. (2007). Mental toughness in sport: A review. *International Journal of Sport and Exercise Psychology*, 5(3), 270-290.
- Loehr, J. (1982). *Mental toughness training for sports*. New York: The Stephen Greene Press.
- Jones, G., Hanton, S., & Connaughton, D. (2002). What is this thing called mental toughness? An investigation of elite sport performers. *Journal of Applied Sport Psychology*, 14, 205-218.
- Clough, P. J., Earle, K., & Sewell, D. (2002). Mental toughness: the concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32-43). London: Thomson Publishing.
- Loehr, J. E. (1995). *The new mental toughness training for sports*. New York: Plume.
- Middleton, S.C., Marsh, H.W., Martin, A.J., Richards, G.E., & Perry, C. (2004a). Discovering mental toughness: A qualitative study of mental toughness in elite athletes. Self Research Centre Biannual Conference, Berlin. Available from http://self.uws.edu.au/Conferences/2004_Middleton_Marsh_Martin_Richards_Perryb.pdf
- Middleton, S.C., Marsh, H.W., Martin, A.J., Richards, G.E., & Perry, C. (2004b). Developing the mental toughness inventory (MTI). Self Research Centre Biannual Conference, Berlin. Available from http://self.uws.edu.au/Conferences/2004_Middleton_Marsh_Martin_Richards_Perrya.pdf
- Williams, R.M. (1988). The U.S. Open character test: Good strokes help. But the most individualistic of sports is ultimately a mental game. *Psychology Today*, 22, 60-62.
- Goldberg, A.S. (1998). *Sports slump busting: 10 steps to mental toughness and peak performance*. Champaign, IL: Human Kinetics.
- Gould, D., Hodge, K., Peterson, K., & Petlichkoff, L. (1987). Psychological foundations of coaching: Similarities and differences among intercollegiate wrestling coaches. *The Sport Psychologist*, 1, 293-308.
- Bull, S.J., Shambrook, C.J., James, W., & Brooks, J.E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology*, 17, 209-227.
- Clough, P.J., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32-43). London: Thomson Publishing

- Gould, D., Dieffenbach, K., & Moffett, A.(2002).Psychological talent and its development in Olympic champions.*Journal of Applied Sport Psychology*, 14, 177-210
- Thelwell, R., Weston, N., & Greenlees, I.(2005).Defining and understanding mental toughness within soccer.*Journal of Applied Sport Psychology*, 17, 326-332
- Bull, S.J., Albinson, J.G., & Shambrook, C.J.(1996).*The mental game plan: Getting psyched for sport*. Eastbourne: Sports Dynamics
- Golby, J., Sheard, M., & Lavallee, D. (2003). A cognitive-behavioural analysis of mental toughness in national rugby league football teams. *Perceptual and Motor skills*, 96, 455-462.
- Engür, M. (2011). Performans Başarısızlığı Değerlendirme Envanteri ve Kendinle Konuşma Anketinin Türk Sporcu Popülasyonu'na Uyarlanması ve Uygulanması. Yayımlanmamış Doktora Tezi, Ege Üniversitesi, İzmir
- Zervas, Y., Stavrou N. & Psychountaki M. (2007). Development and Validation of The Self-Talk Questionnaire (S-Tq) For Sports. *Journal Of Applied Sport Psychology*, 19, 142-159.
- Van Raalte, J. L., Brewer, B. W., Lewis, B. P., & Linder, D. E. (1995). Cork! The effects of positive and negative self-talk on dart throwing performance. *Journal of Sport Behavior*, 18(1), 50.
- Neck, C. P., & Manz, C. C. (1992). Thought self-leadership: The influence of self-talk and mental imagery on performance. *Journal of Organizational Behavior*, 13(7), 681-699.

Mediator Role Of Self-Esteem In The Effect Of Harmony And Obsessive Passion On Psychological Resilience

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Abstract

The objective of this study is to examine the mediator role of the self-esteem levels of the athletes in the relation between harmony-obsessive passion and psychological resilience. In line with the objective of the study, 215 athletes (106 females, 109 males) volunteered to participate in research, who were doing active sports in the 2017-2018 season. The age average of the athletes participating in the research was determined as 20.39 ± 2.49 . Sports experience of the participants was calculated as $\text{Year}_{\text{mean}} = 8.09 \pm 3.93$. In order to reach the objective of the study, Rosenberg Self Esteem Scale, Passion in Sports Scale, and Psychological Resilience Scale (Short Version) were used. In line with the objective of the study, in order to determine the relations among the variables, firstly correlation analysis was conducted. Pearson correlation coefficient necessitates both of the variables to be constant and to demonstrate a normal distribution together (dually). The interpretation of the r values, which are Pearson coefficients, were conducted as such; r values in between .00-.29 indicate a low relation, while in between .30 and .69 they indicate a mid-level relation, and in between .70 and 1.00 high level relation (Büyüköztürk, 2008). The statistical significance level was accepted as .05. Moreover, the PROCESS macro regression analysis was used in order for the mediator role of the social support perceived from the friend and the teacher in between the social support perceived from the family and tendency to cyber bullying. The analyses were conducted in 95 % confidence interval, and in order to test whether the mediator role was significant, Sobel z test was used. For the analyses of the research, SPSS 22.00 package program was used. When the findings of the research are examined, it can be stated that self esteem has a positive mediator role in the predictor effect of harmony and obsessive passion for psychological resilience. According to these results, it is obvious that the sports psychologists, trainers, or relevant managers, who want to create a resource of psychologically enduring athletes, need to support the athletes in a way to increase their self-esteem, and need to take steps in a manner to support their harmony or obsessive passion levels. Considering the psychological factors and performance relations, it is evaluated that harmony or obsessive passion, self esteem, and empowered psychological resilience might play an important role concerning the sportive performance.

Keywords: *Harmony passion, Obsessive Passion, Resilience, Self esteem*

Introduction

Self-esteem focuses on the individuals' need for self-appraisal. Self-esteem is not related to the feeling perfect, but self-awareness, self-acceptance, identity formation, and the acceptance from others (Adams and Gullotta, 1989). The individual's features and environmental conditions influence his/her perspective on life and life position. The processes such as individual's perception of being in a stressful environment, inability to develop healthy self-esteem stemming from weak and unhealthy family bonds, failure to fulfill the taken decisions or the perception of decisions being damaging for individuality have negative impacts on one's world. High self-esteem implies we found ourselves and inner world valuable (Kaya and Saçkes, 2005). In this context, having high-level self-esteem is a positive psychological feature for an individual.

Passion, in which we included in this study, is another positive psychological feature for an individual. Passion can be defined as the love that the individual possesses for the activity he or she is doing. According to the dualistic model approach by Vallerand et al. (2003), passion fundamentally has two dimensions. While the first dimension of passions is "harmony passions" including individual's passion complying with the life, the second dimension is "obsessive passion" that can be a deterrent for daily living activities.

In recent years, the research into psychology and performances of the athletes has become increasingly widespread. Both the theoretical examination of psychological skills (Bayköse et al. 2017; Bayköse et al., 2016; Thompson et al., 2011) and the experimental studies into the understanding of the relationship between psychology and performance (Moore, 2009; Raalte et al, 1995; Dagrou et al., 1992; Williams, 1993) have provided an insight for the sport sciences.

The psychological resilience concept, included in this study, is defined as a personality trait referring to the individual staying physically, mentally, psychologically and healthily positive under intense and stressful conditions (Masten, 1994, Fonagy et al., 1994; Hunter, 2001; Tusaie and Dyer, 2004). In another word, psychological resilience can be expressed as the individual's ability to recover, cope with, and succeed against the events perceived negative and stressful (Luthans et al., 2006). It is seen that psychological resilience correlated with the concepts such as passion (Bayköse et al., 2017) and self-esteem (Fergusson and Lynskey, 1996; Crocker and Park, 2004) in literature.

Starting from the finding that positive psychological factors prevented athletes from stressors (Fletcher & Sarkar, 2012), the aim of this study, which was related to the effects of passion and self-esteem on supporting psychological resilience, was to examine the mediator role of the self-esteem levels of the athletes in the relationship between harmony-obsessive passion and psychological resilience.

METHOD

Research Model

This study is a relational screening model designed to examine the mediator role of the self-esteem levels of the athletes in the relationship between harmony-obsessive passion and psychological resilience. Karasar (2009) defined the relational screening models as the research models aiming at finding out the existence and degree of covariances between two or more variables. In line with this model, the role of self-esteem in the relationship between passion and psychological resilience levels of athletes. Two different models were hypothesized in line with the research purpose. The hypothesized models are displayed as follows.

Figure 1: The first study model

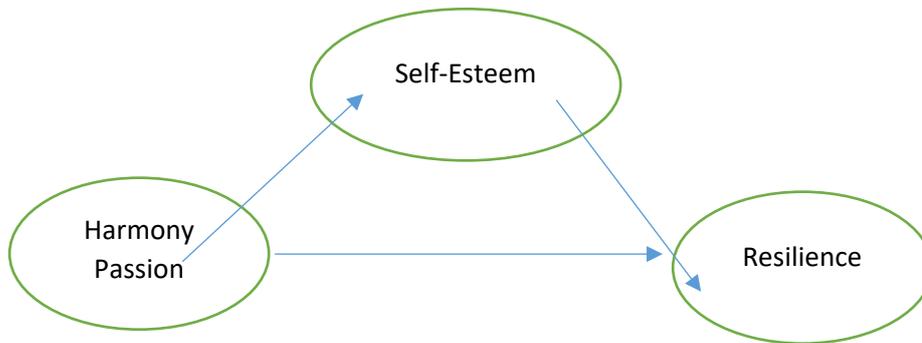
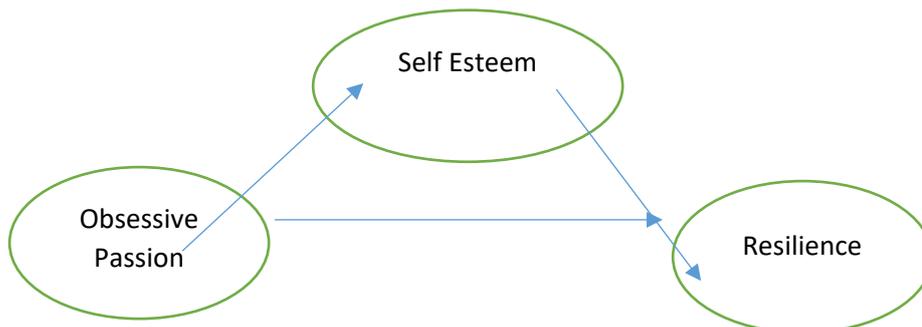


Figure 2: The second study model



Research Group

106 females and 109 males, totally 215 athletes, competing actively during the 2017-2018 season, voluntarily participated in this study. The age mean score of the athletes was 20.39 + 2.49. The sports experience mean score of athletes was $age_{mean}=8.09 + 3.93$.

Data Collection

To reach the research purpose, the Rosenberg Self-Esteem Scale, Passion Scale in Sport, and Psychological Resilience Scale (Short Form) were used. The detailed information about the data collection tools was provided below.

Rosenberg Self-Esteem Scale

Self-esteem scale was developed by Rosenberg and adapted to Turkish culture by Çuhadaroğlu (1986). The scale is a self-report scale including 63 multiple choice items and has twelve sub-dimensions. In line with the research purpose, the first “ten” items of the scale were used. According to the evaluation system of the scale, participants

score between 0 and 6. The higher the score get on the scale, the lower the self-esteem level. Confirmatory factor analysis was applied to test the validity of the scale for our study. The fit indices provided enough evidence for the scale validity ($\chi^2/sd=2,28$, RMSEA=0,037, TLI=0,95, CFI=0,96).

Passion Scale for Sport

Passion Scale in Sport, adapted to Turkish culture by Kelecek and Aşçı (2013), was developed by Vallerand et al. (2003) to determine two type of passion (harmony passion and obsessive passion) to participated and interested activity. The scale was developed to evaluate passion for different activities in the different field and used in this scope today. Passion scale consists of 16 items including 6 items to assess harmony passion, 4 items to assess obsessive passion and 4 items to assess passion to activities in which individuals participate, and it is a 7-point Likert type. While the internal consistency coefficient for Obsessive Passion dimension of Passion Scale in Sport was 0,78, the one for Passion dimension was 0,83. Confirmatory factor analysis was applied to test the validity of the scale for our study. The fit indices provided enough evidence for the scale validity ($\chi^2/sd=2,83$, RMSEA=0,046, TLI=0,94, CFI=0,93).

Psychological Resilience Scale (Short version)

The scale developed by Smith, Dalen, Wiggins, Tooley, Cristopher and Jennifer Bernard (20089) to assess the individuals' psychological resilience. The scale, adapted to Turkish culture by Doğan (2015), is a self-report and 5-point Likert type scale including 6 items. After recoding the related items, the higher score on the scale, the higher psychological resilience and the lower scores, the lower psychological resilience. After the analysis done by Doğan (2015), the scale was found to be a unidimensional scale, and the factor loadings ranged between 0,63 and 0,79. Confirmatory factor analysis was applied to test the validity of the scale for our study. The fit indices provided enough evidence for the scale validity ($\chi^2/sd=2,12$, RMSEA=0,033, TLI=0,97, CFI=0,98).

Analysis

In line with the research purpose, the correlation test was applied to find out the relationship between variables. The Pearson correlation coefficient requires that the two variables are continuous and that the variables have a normal distribution together (dyadically). The value r, which represents the correlation coefficient, has been interpreted as follows: the relationship is low between .00-.29, moderate between .30-.69, and high between .70 and 1.00 (Büyükoztürk, 2008). The significance level was accepted .05 statistically. Moreover, PROCESS macro regression analysis was used. The analysis was done at 95% confidence interval; Sobel z test was used to test if mediation was significant. SPSS 22.00 program was used for the analysis.

Results

Table 1: The Relationship Harmony Passion, Psychological Resilience, and Self-Esteem

	Harmony Passion	Resilience	Self Esteem
	r		
		1	
Harmony Passion	p		
	n	215	
	r	,390**	
Resilience	p	,000	
	n	215	215
	r	,206**	,582**
Self Esteem	p	,002	,000
	n	215	215
			215

** . Correlation is significant at the 0.01 level (2-tailed).

When table 1 is examined, it is seen that a positive and linear relationship is found between psychological resilience and self-esteem. Besides, positive and linear correlation is seen between self-esteem and harmony passion.

Table 2: The relationship between Obsessive Passion, Psychological resilience, and self-esteem

		Obsessive Passion	Resilience	Self Esteem
Obsessive Passion	r	1	,452**	,385**
	p		,000	,000
	n	215	215	215
Resilience	r	,452**	1	,582**
	p	,000		,000
	n	215	215	215
Self Esteem	r	,385**	,582**	1
	p	,000	,000	
	n	215	215	215

** . Correlation is significant at the 0.01 level (2-tailed).

When table 2 is examined, a positive and linear correlation is seen between obsessive passion, psychological resilience, and self-esteem.

Research Model 1

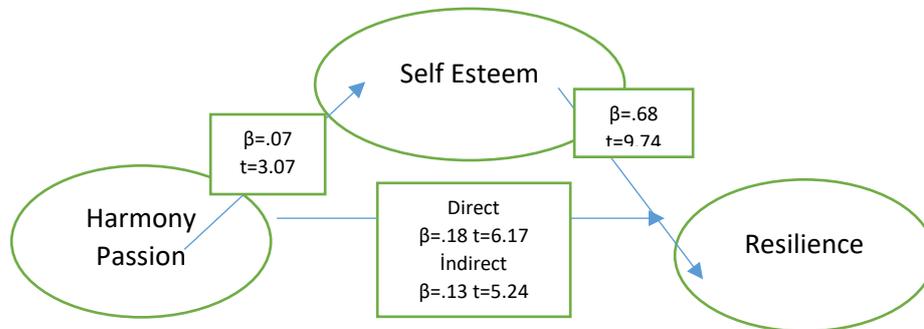


Figure 2: The mediator role of self-esteem level of athletes in the relationship between harmony passion and psychological resilience

The determination that there is a positive and significant correlation between harmony passion and psychological resilience allows testing the hypothesized mediation. PROCESS macro regression analysis was used to test whether self-esteem played a role in the relationship between harmony passion and psychological resilience. The predictive effect harmony passion on self-esteem was examined in the first step of PROCESS macro regression analysis, and it was found that harmony passion predicted self-esteem ($\beta=.07$, $t= 3.07$, $p<.05$) at the level of 4% ($R=.21$, $R^2=.04$, $F= 9,47$, $p<.05$).

In the second step of PROCESS macro regression analysis to determine whether self-esteem played a role in the relationship between harmony passion and psychological resilience, the predictive effect of harmony passion on psychological resilience were examined. When the results were examined, it was seen that harmony passion ($\beta=.18$, $t= 6.17$, $p<.05$) predicted psychological resilience at the level of 15% ($R=.39$, $R^2=.15$, $F= 38,14$, $p<.05$).

In the third step of PROCESS macro regression analysis to determine whether self-esteem played a role in the relationship between harmony passion and psychological resilience, self-esteem was included in the PROCESS macro regression analysis and found that it was seen that self-esteem contributed to the prediction of psychological resilience at the level of 5%. Accordingly, it was found 41% of the total variances was explained via self-esteem in the prediction of psychological resilience by harmony passion to ($R=.64$, $R^2=.41$, $F=74.87$, $p<.05$). In the third step of the analysis, it was observed that the effect of harmony passion on psychological resilience decreased ($\beta=-.13$, $t=5.24$, $p>.05$). Thus, it can be said that self-esteem has a full mediation role in this relationship ($\beta= .68$, $t=-9.74$, $p<.05$). Sobel z test, used to determine whether the mediation role was significant, showed that the mediation relation was statistically significant ($Z= 2.92$, $p<.05$).

Table 3: The results related to the direct and indirect effect of harmony passion on psychological resilience

Direct Effect		Effect	S.E	LLCI	ULCI	t	p
Harmony Passion	Resilience	.127	.0242	.0793	.1749	5.24	.000
Indirect Effect		Effect	S.E	LLCI	ULCI	t	p

Harmony Passion	Self Esteem	Resilience	.049	.0279	-.0003	.1108	6.175	.000
Total Effect			.176	.0285	.1197	.2319		
Normal Theory Test for indirect effect								
Effect: .0487		s.e: .0167		z: 2.9207		p: .003		

In table 3, it was found that total effect (direct + indirect) of harmony passion on resilience was positive ($\beta: 0,127+0,049=0,176$) and statistically significant ($p=0,000$). Because the Z score (2,9207) of this model was higher than 1,96 and significant, the existence of a mediator effect can be said. According to this finding, H_1 (There is a mediation role of self esteem in the influence of harmony passion on resilience) was accepted.

Research Model 2

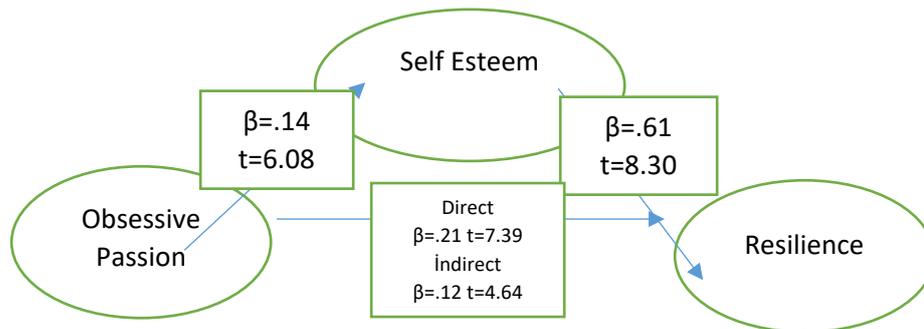


Figure 3: The mediator role of self-esteem level of athletes in the relationship between obsessive passion and psychological resilience

The determination that there is a positive and significant correlation between obsessive passion and psychological resilience allows testing the hypothesized mediation. PROCESS macro regression analysis was used to test whether self-esteem played a role in the relationship between obsessive passion and psychological resilience. The predictive effect obsessive passion on self-esteem was examined in the first step of PROCESS macro regression analysis, and it was found that obsessive passion predicted self-esteem ($\beta=.15, t= 3.07, p<.05$) at the level of 15% ($R=.38, R^2=.15, F= 37,017, p<.05$).

In the second step of PROCESS macro regression analysis to determine whether self-esteem played a role in the relationship between obsessive passion and psychological resilience, the predictive effect of obsessive passion on psychological resilience was examined. When the results were examined, it was seen that obsessive ($\beta=.21, t= 7.39, p<.05$) predicted psychological resilience at the level of 20% ($R=.45, R^2=.20, F= 54,69, p<.05$).

In the third step of PROCESS macro regression analysis to determine whether self-esteem played a role in the relationship between obsessive passion and psychological resilience, self-esteem was included in the PROCESS macro regression analysis and found that it was seen that self-esteem contributed to the prediction of psychological resilience at the level of 5%. Accordingly, it was found 40% of the total variances was explained via self-esteem in the prediction of psychological resilience by the obsessive passion for ($R=.63, R^2=.399, F=70.53, p<.05$). In the third step of the analysis, it was observed that the effect of obsessive passion on psychological resilience decreased ($\beta=.12, t=4.64, p>.05$). Thus, it can be said that self-esteem has a full mediation role in this relationship ($= .61, t=8.30, p<.05$). Sobel z test, used to determine whether the mediation role was significant, showed that the mediation relation was statistically significant ($Z= 4.88, p<.05$).

Table 4: The results related to the direct and indirect effect of obsessive passion on psychological resilience

Direct Effect			Effect	S.E	LLCI	ULCI	t	p
Obsessive Passion	Resilience		.129	.0278	.0744	.1740	4.64	.000
Indirect Effect			Effect	S.E	LLCI	ULCI	t	p
Obsessive Passion	Self Esteem	Resilience	.088	.0271	.0422	.1458	7.39	.000
Total Effect			.218	.0295	.1599	.2762		
Normal Theory Test for indirect effect								
Effect: .0889		s.e: .0182		z: 4.8844		p: .000		

In table 4, it was found that total effect (direct + indirect) of obsessive passion on resilience was positive ($\beta: 0,129+0,088=0,218$) and statistically significant ($p=0,000$). Because the Z score (4,8844) of this model was higher than 1,96 and significant, the existence of a mediator effect can be said. According to this finding, H_1 (There is a mediation role of self esteem in the influence of obsessive passion on resilience) was accepted.

Discussion And Conclusion

106 females and 109 males, totally 215 athletes, competing actively during the 2017-2018 season, voluntarily participated in this study. The age mean score of the athletes was $20.39 + 2.49$. The sports experience mean score of athletes was $age_{mean}=8.09 + 3.93$.

To reach the research purpose, the Rosenberg Self-Esteem Scale, Passion Scale in Sport, and Psychological Resilience Scale (Short Form) were used. The detailed information about the data collection tools was provided below. In line with the research purpose, the correlation test was applied to find out the relationship between variables. The Pearson correlation coefficient requires that the two variables are continuous and that the variables have a normal distribution together (dyadically). The value r , which represents the correlation coefficient, has been interpreted as follows: the relationship is low between .00-.29, moderate between .30-.69, and high between .70 and 1.00 (Büyüköztürk, 2008).

The direct and indirect relationship between passion and psychological resilience levels of athletes was examined in this study. It was found that the psychological resilience of athletes could be increased if their harmony and obsessive passion levels were supported to increase self-esteem. It can be said that the results of this study were supported by some study findings in the literature.

When the results of the structural equation modeling study conducted by Bayköse et al. (2017) to examine the predictive role of self-esteem and passion on psychological resilience were examined, it was suggested that psychological resilience had positive relationships with both self-esteem and harmony passion. The results of Bayköse et al. (2017) supported our findings. In another part of the study by Bayköse et al. (2017), a negative correlation was found between psychological resilience and obsessive passion. In this context, this part of the study by Bayköse et al. (2017) was contradictory with our results. The sample difference can be the reason for this contradiction.

Many researchers suggested that self-esteem positively correlated with psychological resilience. These studies contributed to our findings in various ways (Crocker and Park, 2004; Fergusson and Lynskey, 1996; Vallerand et al. 2003). Furthermore, the results of this study supported the view that psychological resilience was supported by positive psychological factors (Fletcher & Sarkar, 2012).

According to these results, it is evident that sports psychologist, coaches, and managers, who wish the athletes being psychologically resilient, should attempt to support them to increase their self-esteem, harmony and obsessive passion levels. Considered psychological factors and performance relations, it is thought that harmony and obsessive passion, self-esteem and strengthen psychological resilience can play a key role in sports performance.

References

- Bayköse, N., Civar, Yavuz, S., Çoban, M., Şahan, H. & Certel, Z. (2016). "Role of self talk in prediction of passion level in physical education class environment", *Turkish Online Journal Of Educational Technology*, vol.2016, pp.445-452.
- Büyüköztürk, Ş. (2008). *Sosyal Bilimler İçin Veri Analizi El Kitabı*. Ankara: Pegem Akademi Yayınları.
- Crocker, J. ve Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin*, 130, 392-414.
- Çuhadaroğlu, F. (1986), "Adolesanlarda Benlik Saygısı", Yayınlanmamış Uzmanlık Tezi, Hacettepe Üniversitesi, Tıp Fakültesi, Psikiyatri Bölümü, Ankara
- Dagrou, E., Gauvin, L., & Halliwell, W. (1992). Effets de langage positif, négatif et neutre sur la performance motrice [Effects of positive, negative and neutral self-talk on motor performance]. *Canadian Journal of Sport Science*, 17, 145-147.
- Doğan, T. (2015). Kısa psikolojik sağlamlık ölçeği'nin Türkçe uyarlaması: Geçerlik ve güvenirlik çalışması. *The Journal of Happiness & Well-Being*, 3(1), 93-102.
- Fergusson, D. M. ve Lynskey, M. T. (1996). Adolescent resiliency to family adversity. *Journal of Child Psychology and Psychiatry and Allied Disciplines*, 37, 281-292.
- Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of sport and exercise*, 13(5), 669-678.
- Fletcher, D., & Sarkar, M. (2012). A grounded theory of psychological resilience in Olympic champions. *Psychology of sport and exercise*, 13(5), 669-678.
- Fonagy, P., Steele, M., Steele, H., Higgitt, A., ve Target, M. (1994). The Emmanuel Miller memorial lecture 1992: The theory and practice of resilience. *Journal of Child Psychology and Psychiatry*, 35, 231- 257.
- Hunter A. J. (2001) A Cross-cultural Comparison of Resilience in Adolescents. *J Pediatr Nurs*, 16:172-179.
- Karasar, N. (2009). Bilimsel araştırma yöntemi (19. bs). *Ankara: Nobel yayın dağıtım*.
- Keleş, S., & Aşçı, F. H. (2013). "Tutkunluk Ölçeği" nin Üniversite Sporcuları İçin Geçerlilik ve Güvenilirlik Çalışması. *Türkiye Klinikleri Spor Bilimleri*, 5(2).
- Masten, A. (1994). Resilience in individual development: Successful adaptation despite risk and adversity. In M. C. Wang ve E. W. Gordon (Eds.), *Educational resilience in inner-city America: Challenges and prospects* (3-25). Hillsdale, NJ: Lawrence Erlbaum.

- Moore, Z. E. (2009). Theoretical and empirical developments of the Mindfulness-Acceptance-Commitment (MAC) approach to performance enhancement. *Journal of Clinical Sport Psychology, 3*(4), 291-302.
- Raalte, J. L. V., Brewer, B. W., Lewis, B. P., Linder, D. E., Wildman, G., & Kozimor, J. (1995). Cork! The effects of positive and negative self-talk on dart throwing performance. *Journal of Sport Behavior, 18*(1), 50.
- Rosenberg, M. (1965). *Society and Adolescent Self-image*. Princeton University Press, New Jersey.
- Smith, B. W., Dalen, J., Wiggins, K., Tooley, E., Christopher, P., & Bernard, J. (2008). The brief resilience scale: assessing the ability to bounce back. *International journal of behavioral medicine, 15*(3), 194-200.
- Thompson, R. W., Kaufman, K. A., De Petrillo, L. A., Glass, C. R., & Arnkoff, D. B. (2011). One year follow-up of mindful sport performance enhancement (MSPE) with archers, golfers, and runners. *Journal of Clinical Sport Psychology, 5*(2), 99-116.
- Tusaie K. & Dyer J. (2004) Resilience: A Historical Review of the Construct. *Holist Nurs Pract, 18*:3-8.
- Vallerand, R. J., Blanchard, C., Mageau, G. A., Koestner, R., Ratelle, C., Léonard, M., ... & Marsolais, J. (2003). Les passions de l'ame: on obsessive and harmonious passion. *Journal of personality and social psychology, 85*(4), 756.
- Williams, J. M. E. (1993). *Applied sport psychology: Personal growth to peak performance*. Mayfield Publishing Co.

Modelling Of Mortality – Presentation Of Deras Software Using In Demographic Education

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Abstract

Population aging is very often discussed topic. People live until higher age. The age of living is increasing because of a few reasons. As the first one could be mentioned the increasing level of health care. The second one could be healthier life style – increasing interest of people about healthy diet, more sport, etc. Mainly these reasons caused increasing of life expectancy. On the other hand numbers of death are increasing (especially at the higher ages). That is why the reliability of demographical data is increasing at higher ages. Because of the aging population the evolution in these ages is more and more important. That is why the modelling of mortality is increasingly important. It is important to have the best imagination about the evolution of mortality at the highest ages. One of the approaches of modelling of mortality is the using of analytical functions.

The aim of this article is the presentation of selected mortality models. These models could be divided into several groups (exponential, logistic, polynomial, etc.). Gompertz law of mortality, Gompertz-Makeham function or Coale-Kisker model could be included among exponential functions. Kannisto, Thatcher or Heligman-Pollard model could be included into logistic group.

The other aim is the presentation of software DeRaS in which these models are implemented. In this article will mentioned procedure required for the calculation of mortality tables in DeRaS. The advantages of fit will be mentioned after that. Results will be presented at the end of this part. Here will be used the possible options of DeRaS software.

The data about mortality of Czech population will be used for the calculations. The data are from the Czech Statistical Office database. The data for the last disposable year will be used for the calculation (2016).

Key words: *Models of mortality, age, DeRaS software*

Introduction

The aging of population is discussed topic in last days. People live until higher ages and higher number of deaths at these ages is connected with it. So it is very important to make changes in social system and in health care system for the future. The modelling of mortality is increasingly important because of this reason.

Methodology

For the modelling of mortality could be used several approaches. One of these are the analytical functions. The functions presented in this article are using at the ages 60+.

Models Of Mortality

Gompertz function

The Gompertz law of mortality is one of the oldest models of mortality. It could be written like

$$\mu(x) = a \cdot e^{b \cdot x},$$

where x is the age, a, b are parameters of the model, $\mu(x)$ is the force of mortality (Gompertz, 1825).

The force of mortality can be roughly expressed as $\mu(x+0,5) \doteq m_x$, where the age-specific death rate (m_x) is given as:

$$m_x = \frac{M_x}{E_x},$$

where M_x is the number of deaths at age x and E_x is the exposure to risk for x -year olds.

This model assumes exponential increase in mortality with an increasing age.

This model was improved by many authors, e.g. Gavrilov a Gavrilova (2011, 1) or Koschin (1999).

The Gompertz-Makeham function

The Gompertz law of mortality was improved by W. M. Makeham. The other parameter was included into the function. This parameter expresses deaths independent on the age (Makeham, 1860).

$$\mu(x) = c + a \cdot e^{b \cdot x},$$

where x is age, a, b and c are parameters of the model.

The Gompertz-Makeham function could be written in simpler version:

$$\mu(x) = c + a \cdot b^x,$$

where x is the age, a, b, c are parameters of model.

The Gompertz-Makeham function is very often used function for modelling of the intensity of mortality at higher ages. It almost ideally describes mortality from 60 to 85 years. But the constant increase in mortality is not true for the ages 85+. The Gompertz-Makeham function was also very important for the scientific research of Thatcher, Kannisto Vaupel (1998) or Gavrilov and Gavrilova (2011, 2).

Coale-Kisker model

Coale-Kisker model is focused on changes of deaths rates between two consecutive ages. Authors assume not constant increase at the highest ages but linear decrease. Coale and Kisker based on determination of variable k_x by Coleho, Magalhães, Bravo. This variable could be written like

$$k_x = \ln\left(\frac{m_x}{m_{x-1}}\right),$$

where m_x is the age-specific death rates.

Variable k_x is decreasing from the age 85:

$$k_x = k_{85} - (x - 85) \cdot s,$$

where x is age, k_{85} and s are parameters of the model.

This model is based on two assumptions:

1. The age-specific death rates have to be equally reliable around the age 85.
2. This assumption relates to the value of the age-specific death rate in the age considered as the highest achievable (the authors set it for 110 years). If the age-specific death rate is determined at this age then it will allow us to estimate the parameter s . The age-specific death rate at the age of 110 was set at 1.0 for males and 0.8 for females (both values are based on the level of death rates in the Swedish population).

The final model then corresponds to an exponential-quadratic function. It could be expressed as

$$\mu(x) = e^{a \cdot x^2 + b \cdot x + c},$$

where x is age, a, b and c are unknown parameters (Thatcher et al., 1998).

The model of Coale and Kisker was further dealt with by Thatcher, Kannisto and Vaupel (1998) or Burcin, Tesárková and Šídlo (2010).

Heligman and Pollard model

The original form of the model was focused on modeling of mortality throughout the whole age range:

$$q_x = A^{(x+B)^C} + D \cdot e^{-E \cdot (\ln(x) - \ln(F))^2} + \frac{G \cdot H^x}{1 + G \cdot H^x},$$

where x is age, A, B, C, D, E, F, G and H are unknown parameters.

The model tries to eliminate the dearth of all other models which model mortality only at higher ages. The aim of the authors was to create a model that would be appropriate to capture mortality even in the lower age (Boleslawski, Tabeau, 2001).

Since the other models deal with modeling of the intensity of mortality only for older people, I will only consider the third part of the original eight-parameter version of the model.

The model of Heligman and Pollard is shaped as follows:

$$q_x = \frac{G \cdot H^x}{1 + G \cdot H^x},$$

where x is the age, G and H are unknown parameters.

Therefore, the same function is used as in the Himes-Preston-Condran model. The difference, however, is that the model of Heligman and Pollard models the probability of dying rather than age-specific death rates.

One of the first logistics models was designed by Perks in 1932. Perks first noted that mortality rates can be

described by a curve - a logistic function.

Kannisto model

Another logistic model is the Kannisto model. Kannisto found that mortality rates in modern populations are very close to one of the simplest forms of a logistic function in which logit (μ_x) can be expressed as a linear function of the age. The same model function was used by Himes, Preston and Condran in 1994.

$$\mu_x = \frac{a \cdot e^{b \cdot x}}{1 + a \cdot e^{b \cdot x}},$$

where x is the age, a , b are unknown parameters.

Logit (μ_x) is a linear function of age written in the form:

$$\text{logit}(\mu_x) = \ln(a) + b \cdot x$$

Thatcher model

Another form of the logistics model was introduced by Thatcher. It differs from the basic logistic function by including the other parameter (characterizing age-independent mortality).

$$\mu_x = c + \frac{a \cdot e^{b \cdot x}}{1 + a \cdot e^{b \cdot x}},$$

where x is the age, a , b and c are unknown parameters (Thatcher, 1999).

As was mentioned above, a number of authors have used the logistic function for modeling mortality. Later they were followed by another Canudas-Romo (2008).

Software Deras

DeRaS (see Figure 1) has been designed for modelling of mortality using the above-mentioned models. Before computing, you first need to insert an Input File and choose where we want to store outputs (Output Directory). Finally, we set a calculation period - the mortality tables can be calculated for several years to determine the time series.

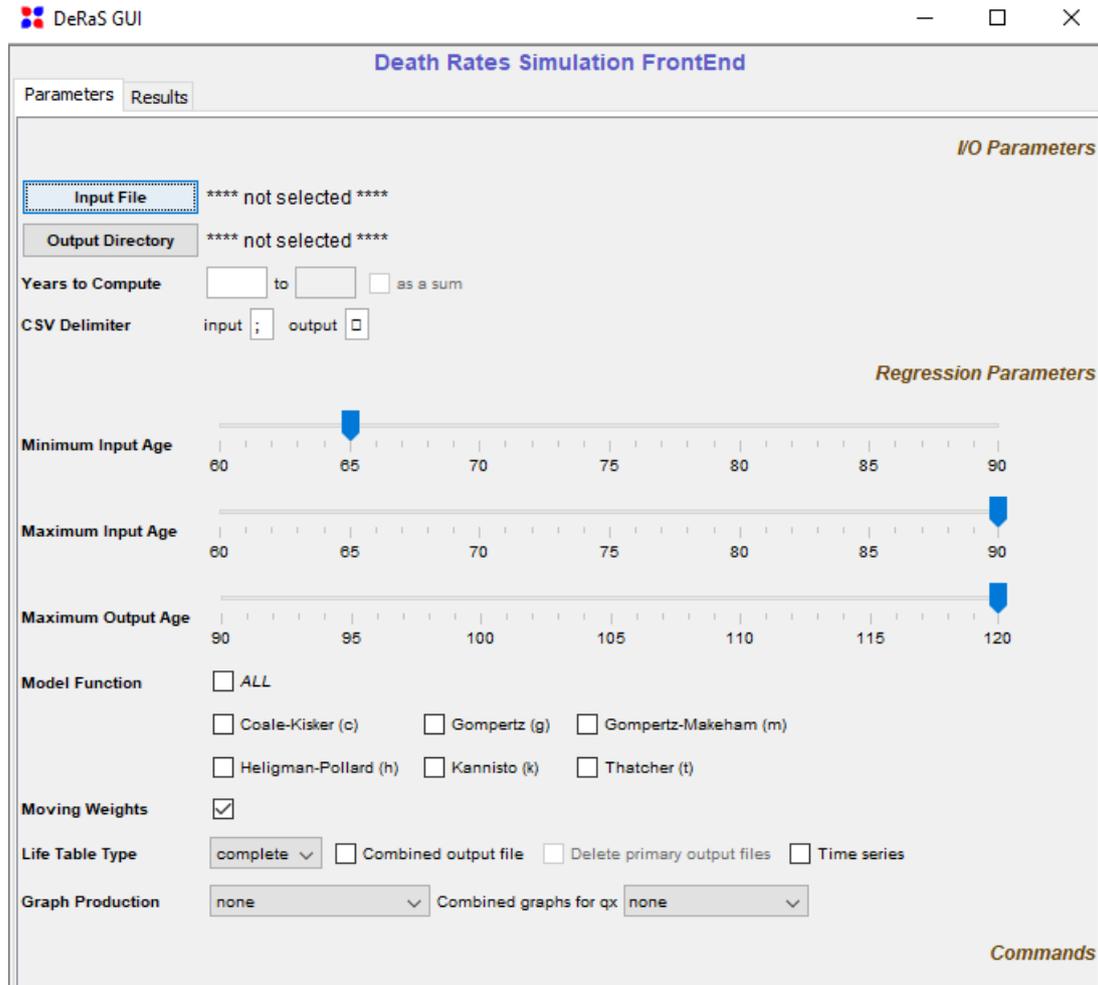
The software also offers a choice of age range in which the model parameters will be estimated (minimum output age and maximum output age). Finally, you need to set the maximum output age (the age until which mortality tables are counted).

In the next step, we can choose which analytic functions will be used to calculate mortality tables. DeRaS also offers a choice between full and abridged mortality tables.

A great advantage is the creation of figures. DeRaS offers a figure for the probability of dying, life expectancy, etc. For the probability of dying, it is possible to create a combined figure that compares all models.

Sample of DeRaS Software Environment:

Figure 1: Enviroment of DeRaS software



Source: DeRaS (2012)

For the estimation of unknown parameters is used nonlinear regression procedure.

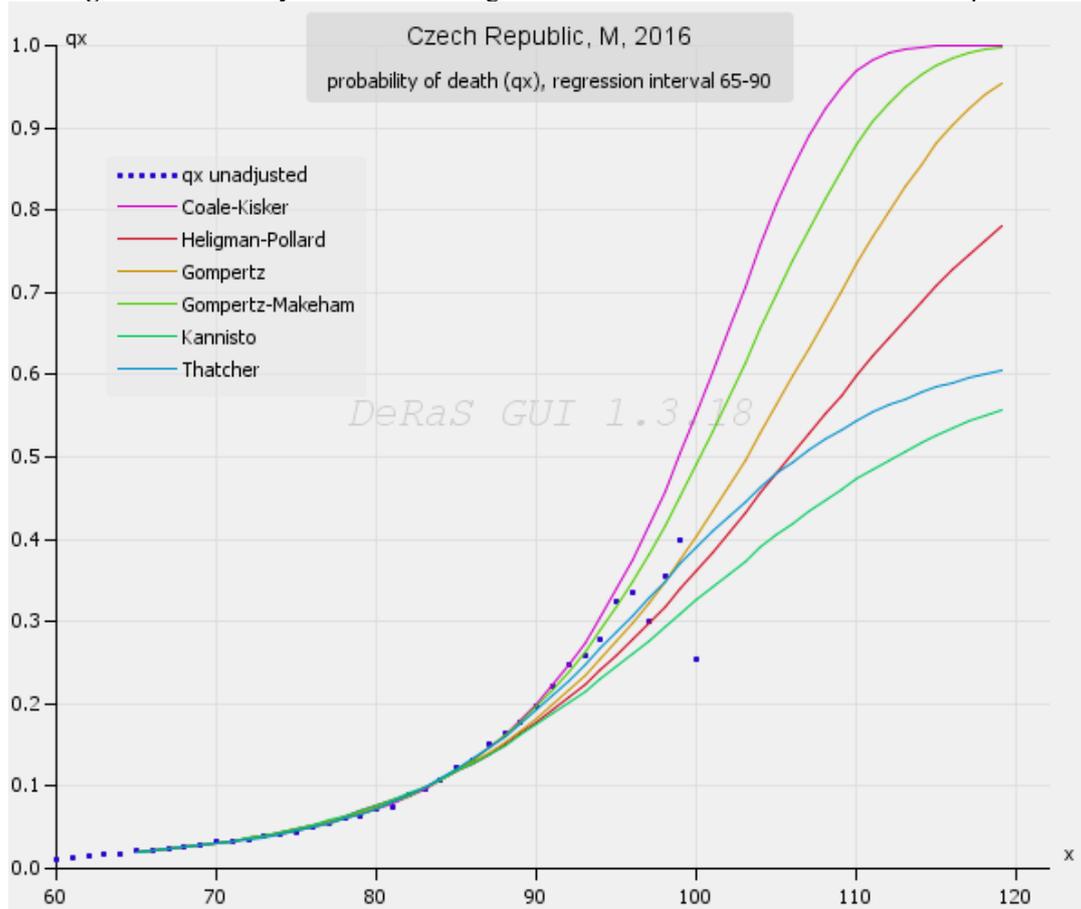
Results

For the calculations was used the data about mortality of the Czech population for the last available year (i.e. 2016). As the input data was used the number of deaths according age and gender, the number of mid-year population according age and gender, and the number of live births sorted by gender.

For the demonstration of the output is used a combined figure for probability of death.

The figure (Figure 2) shows modeling probabilities of dying for the Czech males according to every single model. The figure also contains empirical probability of death. The results show that the highest values are given by Coale - Kisker and Gompertz - Makeham model. On the other hand, the lowest values we obtain for the Kannisto and Thatcher model.

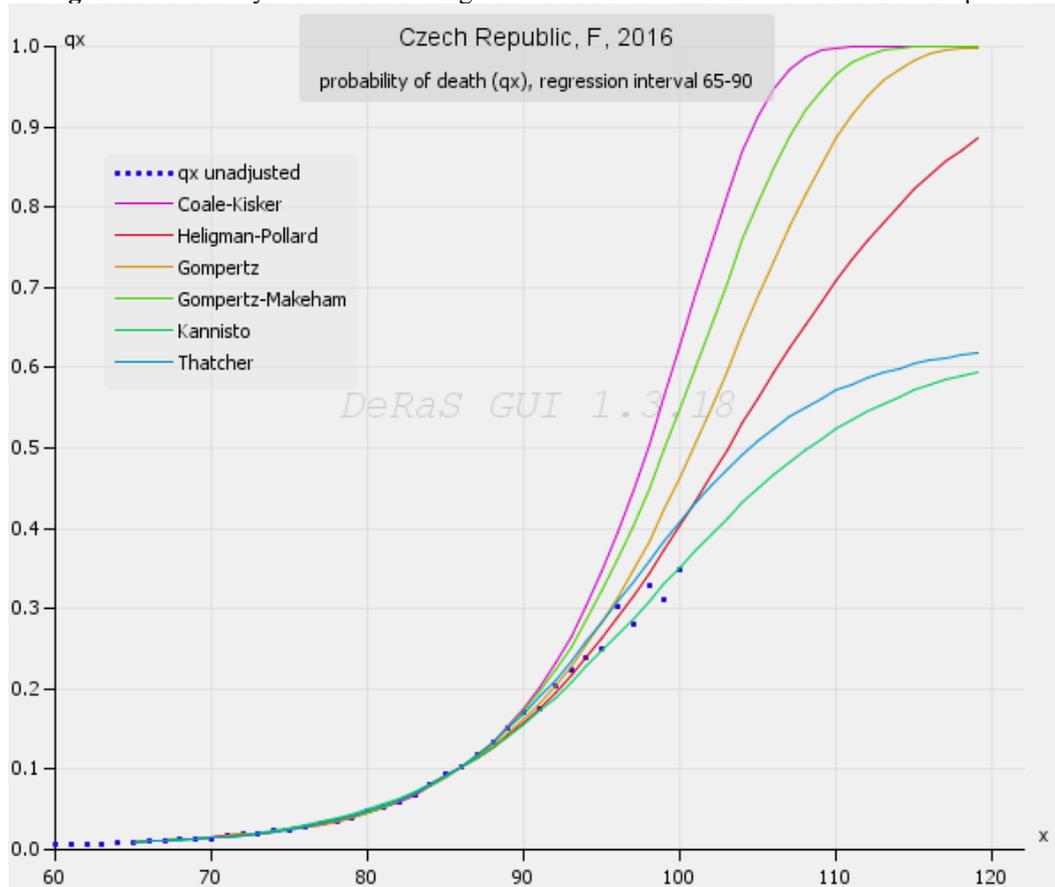
Figure 2: Probability of death according to selected models – males in the Czech Republic



Source: data CZSO, author's calculation (DeRaS, 2012)

The following figure (Figure 3) contains modeling probabilities of dying for the Czech females. Based on the obtained results, it can be said that the highest values are provided by the Coale-Kisker model, the lowest values are provided by Kannisto and Thatcher model. And as the average model can be classified the Heligman-Pollard model.

Figure 3 Probability of death according to selected models – females in the Czech Republic



Source: data CZSO, author's calculation (DeRaS, 2012)

Conclusion

One of the aims of this article was modelling of mortality in at ages 60+ by using selected analytical functions. Based on the obtained results, we can conclude that the highest values for probability of dying are achieved by using the Coale-Kisker model or the Gompertz-Makeham function. On the other hand, we get the lowest values for the Thatcher or Kannisto model. Among the average models we can include the Heligman-Pollard model. Another aim was to introduce the DeRaS software in which these models are implemented. Its advantage is the speed of getting the outputs. Several functions can be used to model of mortality, and it is possible to determine the age range to be used for the estimation of parameters. The software also offers graphical outputs and a choice between full and abridges mortality tables.

Refences

- Boleslawski, L. & Tabeau, E., (2001). Comparing Theoretical Age Patterns of Mortality Beyond the Age of 80. In: Tabeau, E., van den Berg J., A. and Heathcote, Ch. (eds.) 2001. *Forecasting Mortality in Developed Countries: Insights from a Statistical, Demographic and Epidemiological Perspective*. s. 127 – 155. ISBN 978-0-7923-6833-5.
- Burcin, B., Tesárková, K. & Šídlo, L., (2010). “Nejpoužívanější metody vyrovnávání a extrapolace křivky úmrtnosti a jejich aplikace na českou populaci.“ *Demografie* 52, 2010: 77 – 89.
- Canudas-Romo, V., (2008). The modal age at death and the shifting mortality hypothesis. *Demographic research* 19 (30), 2008, pp. 1179-1204.
- CZSO (2018). [5. 6. 2018]. Available from: <<http://www.czso.cz/>>
- Burcin, B., Hulíková, Tesárková, K. & Kománek, D., (2012). *DeRaS: software tool for modelling mortality intensities and life table construction*. Charles University in Prague, Prague. <<http://deras.natur.cuni.cz>>
- Gavrilov, L., A. & Gavrilova, N., S., (2011). “Mortality measurement at advanced ages: a study of social security administration death master file.“ *North American actuarial journal* 15 (3): 432 – 447.
- Gavrilov, L., A. & Gavrilova, N., S., (2011). “Stárnutí a dlouhověkost: Zákony a prognózy úmrtnosti pro stárnoucí populace.“ *Demografie* 53, 2011: 109 – 128.

- Gompertz, B., (1825). On the Nature of the Function Expressive of the Law of Human Mortality, and on a New Mode of Determining the Value of Life Contingencies. *Philosophical Transactions of the Royal Society of London* **115**, pp. 513–585.
- Fiala, T., (2002). *Výpočty aktuárské demografie v tabulkovém procesoru*, 1. vyd. Praha : Oeconomica, 2002. 218 s. ISBN 80-245-0446-4.
- Koschin, F., (1999). “Jak vysoká je intenzita úmrtnosti na konci lidského života?” *Demografie* 41 (2), 1999: 105 – 109.
- Makeham, W., M. (1860). On the Law of Mortality and the Construction of Annuity Tables. *The Assurance Magazine, and Journal of the Institute of Actuaries* **8**, pp. 301–310.
- Pavlík, Z., Rychtaříková, J. & Šubrtová, A., (1986). *Základy demografie*. Praha, 1986.
- Thatcher, R., A., Kanistö, V. & Vaupel, J., W., (1998). *The Force of Mortality at Ages 80 to 120*. Odense University Press, 1998. ISBN 87-7838-381-1.

Modelling Of The Open-Ended Items For Assessing Multiple Proficiencies In Mathematical Problem Solving

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Abstract

This study aims to investigate a sound model by comparing the unidimensional, multidimensional, and multidimensional item bundles models. Answering the open-ended question is one of the most important tasks for assessing the product and process of mathematical problem solving through the use of multiple proficiencies. Its use may cause a violation of item local independence due to its being multiple scores from a common open-ended task on multiple proficiencies. The instrument involves seven tasks encompassing three item bundles that share a common open-ended question for Thai sixth-grade students. The results show that all multi-dimensional models fit better than the unidimensional model. Although the bundles model is the best fit, the two multidimensional models have very similar values in terms of their reliabilities, correlations, and weighted fit statistics. In a real-world context, the multidimensional model is an adequate simpler explanation and, at an international level, provides richer information to the classroom teacher. Further analysis focused on the appropriate amount and the types of common tasks for using the item bundles model and demonstrate the magnitude of the bundle effect that impacts parameter estimates and test precision.

Keywords: *Assessment design; MRCML model; multidimensional proficiencies; problem solving; Rasch analysis*

Introduction

Assessing mathematical problem solving (MPS) is one of the most interesting issues because it significantly contributes to the outcomes of mathematics education (National Council of Teachers of Mathematics (NCTM), 2000). In recent years, 'embedded assessment' has been a major topic of interest, debate, and experimentation in the nationwide efforts at educational reform in each country (Hickendorff, 2013; Jones, Swan, & Pollitt, 2014), particularly in mathematics (Arieli-Attali & Cayton-Hodges, 2014; Stylianou, 2013). Assessing MPS focuses not only on the product of teaching but also on the process of thinking. Therefore, by answering the open-ended question is the most efficient task for eliciting the multiple proficiencies of the students because they need to use their responses to the previous step to solve problems in the subsequent step before obtaining the final answer.

Past researchers Hickendorff (2013), Jones et al. (2014), and Youngchim, Pasiphol, and Sujiva (2015) revealed that the strength of using the multidimensional approach to examine and develop problem solving tasks and cognitive processes but they only emphasize formal test administration rather than the embedded assessment in the curriculum. Besides, past studies focus on students' profiles based on the differences in the dimensions rather than the levels of proficiency, reflecting on students' progress in each dimension (i.e. progress variables), which is a major focus of instruction and assessment activities (Black, Wilson, & Yao, 2011). It is important to note that the tasks are not designed to provide information on the separate dimensions, particularly when items require multiple latent traits within one single task.

The aim of this study is to investigate a sound model for assessing MPS relating to the modeling of items in a common open-ended question by comparing three models namely unidimensional (UD), multidimensional (MD), and multidimensional item bundles (MDB) models. The results of this study are important because they provide evidence for selecting the model with the flexibility and appropriateness for assessment in the real-world context. The idea that students can obtain the right answer for wrong reasons needs to be taken into account when developing assessment tools.

Modelling Of Items In The Common Open-Ended Question

According to Webb (1998), developing a task requires identifying the specific assessment objectives, revealing the extent to which a student possesses knowledge of the idea being assessed, and disclosing how students have integrated their knowledge of this idea into other ideas or contexts. Therefore, the tasks for assessing MPS frequently require a number of cycles for piloting and revising the questions particularly true for open-response questions in which students are asked to generate and write more than one way of stating the answer and for higher order thinking, eliciting the knowledge to be assessed, and revealing something of the process of MPS through the use of three dimensions namely procedures (PC), strategies (ST), and reasoning (RE). Researchers compared the three models of item modeling namely UD, MD, and MBD models. Although the three models are related to a common open-ended question or a common prompt, the measurement models are different for the design matrices specifying the relationship between the response to the items and the structural parameters assumed to underlie a given measurement situation.

In the UD, the sum of scores received from 14 items, ranging from 0-56 can be treated as the student’s response for a single estimate of MPS (see Figure 1). It has the advantage of parsimony in modeling student proficiency and summarizing student’s MPS with a single number, which represents the performance on the 14 items. The probability of a student’s response is in category k of item i (P_{ik}), as opposed to the previous category k-1 (P_{ik-1}), for each of the 14 items depicted in Equation 1. This equation is related to the level of that student’s ability on unidimension (θ) and the relative difficulty of categories k (δ_{ik}) for disclosing the level of MPS.

$$\log(P_{ik}/P_{ik-1}) = \theta - \delta_{ik} \quad (1)$$

Analyzing the data compositely with the ACER ConQuest Version 2.0 (Wu, Adams, Wilson, & Haldane, 2007) produces estimates for a total of fifty-seven parameters: fifty-six item (δ) and step (τ) difficulties, and one population variance. In the analysis, we constrain the population mean to zero so that all item parameters can be estimated while ensuring parameter identification.

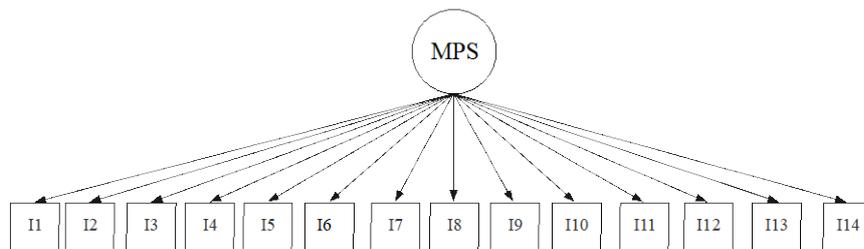


Figure 1: Unidimensional model

The MD can be viewed as a compromise between the UD and consecutive models that incorporate the best of both approaches (Allen & Wilson, 2006; Briggs & Wilson, 2003). The UD composites the scores with the single variable, and the consecutive approach summarizes the scores on items associated with each of the three MPS variables namely PC, ST, and RE (see Figure 2). The scores on each dimension provide distinct information about each examinee by incorporating the correlation between the dimensions directly into the model. There is a direct influence of the latent MPS for each dimension on the items assigned to the dimension depicted through the straight arrows but there is also an influence from all the other dimensions through the curved lines. The curved lines are represented associations rather than causes.

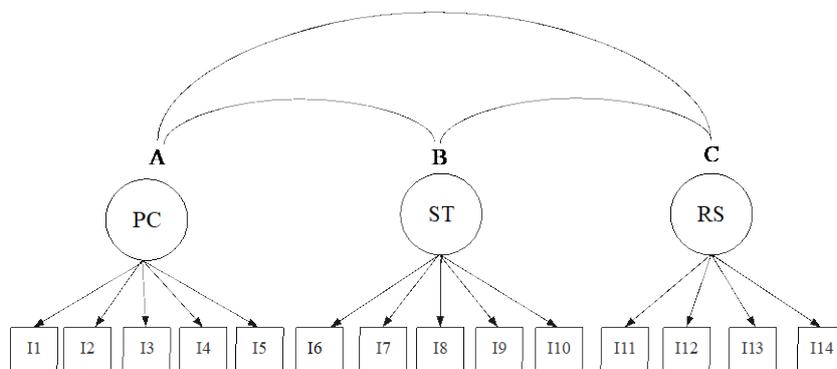


Figure 2: Multidimensional model

This model can be modeled using the Multidimensional Random Coefficient Multinomial Logit (MRCML) model

to estimate latent MPS across the three dimensions simultaneously. The MD uses the formulation from Equation 2 (compare with Equation 1):

$$\log(P_{ik}/P_{ik-1}) = \theta_d - \delta_{ik} \quad (2)$$

The major difference between Equations 1 and 2 is that, here, the person estimate, θ_d , is now also subscripted by the dimension, d. The multiple d values allow the researcher to model examinees' level of MPS on each of the separate dimensions represented in the scale. There are now three population means for this analysis (constrained to zero for identification), three variance estimates and six covariance estimates. Altogether, a total of sixty-two parameters are estimated using ConQuest.

Rosembaum (1988) introduces the term 'item bundle' to denote precisely the type of item subset and drawing attention to the possibility of generalizing the concept of conditional independence so that it would allow tests composed of item bundles to be calibrated in ways similar to tests that adhere to the usual formulation of conditional independence. In the case of the strict bundle independence model, that is, a model without parametric dependence between bundles (B), then the maximum number of parameters that can be estimated for each bundle (B1, B2, B3) is the $M^R - 1 = 5^3 - 1 = 124$ response pattern, where M is the number of item categories and R is the number of item bundles (see Figure 3). The MDB model uses the formulation from Equation 3 (compare with Equations 1 and 2):

$$\log(P_{ck}/P_{ck-1}) = \theta_d r_c - \delta_{ck} \quad (3)$$

The probability of a student's response is in category k of bundle c (P_{ck}), as opposed to the previous category ck-1 (P_{ck-1}), for each items bundle. This equation is related to the level of the student's ability on each dimension (θ_d) and the relative difficulty of categories k (δ_{ck}) to bundle c with the level of MPS. In addition, this model adds the score of each category on bundle c (r_c) for this study.

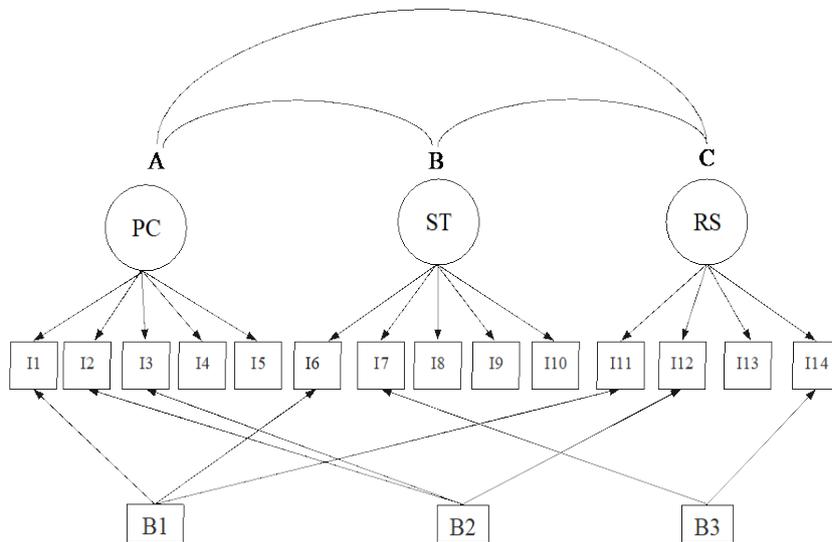


Figure 3: Multidimensional item bundles model

Methodology

The construct modeling approach is an example of an assessment system called the Berkeley Evaluation and Assessment Research (BEAR) Assessment System, which is largely based on performance assessment particularly on assessment that are embedded in the pedagogy and curriculum rather than administered as formal 'tests'. This approach is based on the ideas of developmental assessment (Wilson, 2005). The elements of the system are based on four principles, namely (i) construct maps (a developmental perspective on student learning); (ii) design of tasks (a match between instruction and assessment); (iii) outcome space (teacher management and responsibility), and (iv) measurement model / Wright map (generating quality evidence) described in detail by Wilson and Sloane (2000).

The PC construct map represents the degree to which a student selects an appropriate solution and obtain the correct answers. This construct map contains five levels of the learning progression to capture student successes in four operations of whole numbers, addition, subtraction, multiplication, and division. It describes the development of mathematical procedures as progressing from exploring inappropriate solutions and obtaining the wrong answers to show an appropriate solution and operation without error. The ST construct map captures students' ability to choose and use strategies for representing the algorithm and notation with reflection for familiar or unfamiliar problems. The expectation at higher level is that students can demonstrate the ability to move from concrete to abstract representations such as drawing a diagram, guessing, checking, and improving a solution,

making an organized list, making a table, working backwards, using logical reasoning, looking for a pattern, and/or using a model. The RE construct map examines the quality of the student's demonstration of logical reasoning with strong explanations that include both clear text and proper mathematical notation.

The design of tasks is focused on the number and operation involved in solving the four fundamental mathematical operations of cardinal number prompts. All the MPS items are created based on the desired performance of the Basic Education Core Curriculum of Thailand, Ministry of Education (2008) for Thai sixth-grade students. The learning standards consist of (i) an understanding of diverse methods of presenting numbers and their application in real life; (ii) an understanding of the results of operations of numbers, the relationship of operations, and the application of operations for problem solving; (iii) the use of estimation in calculation and problem solving, and (iv) an understanding of the numerical system and the application of numerical properties.

The outcome space is one scoring guide for each of the three MPS variables based on the student's level of proficiency on an assessment task is determined. The guide is used throughout the entire class for all assessments relating to a particular dimension. The definition of PC, ST, and RE are contained in the scoring guides, which describe the thinking process needed to reach the various scoring levels ranged from 0 to 4 on the elements of the variables (see Figure 4).

Score	Uniform Level	Procedures (PR)	Strategies (ST)	Reasoning (RE)
4	proficiency is above and beyond what is asked of the student	<ul style="list-style-type: none"> -Systematically explore a problem to gain an understanding of how relevant information to make structure and conjectures. - Use of procedures and operations without arithmetic/solution errors in multiple-step. -Show an appropriate solution and get the correct answers. 	<ul style="list-style-type: none"> -Use the multiple strategies to understand all information pertained to the problem. -Choose and use the multiple strategies representing the complex algorithm or procedures, such as drawing a diagram, guessing and improving, making an organized list, making a table, working backwards, using logical reasoning, looking for a pattern, or/and using a model. -Demonstrate the ability to move from concrete to abstract representations. 	<ul style="list-style-type: none"> -Makes predictions and justifications using information from their work effectively, accurately, and thoroughly. -Make a reasonable estimate and evaluate reasonableness of solutions, analysing the effect of the use each, and how they relate to each other -Be able to use deductive arguments to justify decisions and may result in formal proofs. -Demonstrates logical reasoning with strong explanations that include both words and proper mathematical notation.
3	proficiency is mostly complete and appropriate performance	<ul style="list-style-type: none"> -Solve a one-step and two-step solutions correctly but they will not complete all the steps. -Mostly explore a problem by using procedures and operations appropriately. - Show an appropriate procedures and operations but may still get incorrect answers because of miscalculations or misconception in the minor part of the notation. 	<ul style="list-style-type: none"> -Use a variety of strategies for representing algorithm or procedures appropriately and systematically with the major part of mathematical basis. -Use both words and proper mathematical notation for explanation, such as drawing the pictures, making a guess and test it, or/and eliminating possibilities, etc. 	<ul style="list-style-type: none"> -Construct argument with an adequate mathematical basis. -Demonstrates logical reasoning with appropriate explanations that include both words and proper mathematical notation. -Mostly make predictions and justifications effectively and accurately by using information from their work. -May show inappropriate predictions and justifications in the minor part of the problem.
2	proficiency is partly appropriate but missing something important	<ul style="list-style-type: none"> -Begin to solve basic, one-step equation in a limited way based on their observations of familiar problems. -Can identify, recall, recognize of the mathematical content. For example--recognize a multiplication table listing all the multiples of positive integers from 1 through 12 etc. ($2 \times 3 = 6$, $12 \times 3 = 36$). - Use of procedures and operations inappropriately because they are not adequate conceptual understanding. -May show a major misconception of procedures and operations. -Demonstrate the wrong answers based upon an inappropriate solution and errors in the major part of the notation. 	<ul style="list-style-type: none"> -Use strategies for representing algorithm or procedures with the minor part of mathematical basis. -Choose and use the beginning strategy for exploring one or/and two steps a problem in the simple algorithm or procedures based on their observations of familiar problems but they give partly support or relevant answer, such as—using the words or/and the simple formulas. 	<ul style="list-style-type: none"> -Make argument with a little mathematical basis. -Partially demonstrate logical reasoning and conceptual understanding in some but not all. -Show inappropriate predictions and justifications in the major part of the problem.
1	proficiency is inappropriate	<ul style="list-style-type: none"> -Use of procedures and operations inappropriately because they are inadequate content knowledge and conceptual understanding. -Do not start to solve a simple problem because they do not identify, recall, recognize of the mathematical content. For example--do not recognize a 	<ul style="list-style-type: none"> -Be unable to use strategy with mathematical basis. -Use only words for explaining but do not support or relevant answer. 	<ul style="list-style-type: none"> -Make arguments with no mathematical basis. -Lack of logical reasoning and accuracy. -Unable to predict and justify by using information from their work.

		multiplication table listing all the multiples of positive integers from 1 through 12. -Demonstrate the wrong answers based upon an inappropriately simple solution and errors in their calculations.		
0	an off-task	-Do not answer, attempt, or give relevant responses.	-Do not answer, attempt, or give relevant responses.	-Do not answer, attempt, or give relevant responses.

Figure 4: The MPS scoring guide in each dimension

The measurement model used is the Multidimensional Random Coefficients Multinomial Logit Model (MRCLM) by Adams, Wilson, and Wang (1997). MRCLM is a general and flexible model that allows for the specification of a large number of multidimensional item response models (Draney, Yamada, & Xie, 2000). The MRCLM describes the proficiency of person N as a V -dimensional vector $\theta = (\theta_1, \dots, \theta_V)$. The relationship between items and dimensions is specified by a scoring function, such that a response in category j to item i is represented by a V column vector of length V $\mathbf{b}_{ik}=(b_{ik1}, \dots, b_{ikV})'$. These column vectors are then collected into a scoring submatrix \mathbf{B}_i for item i , and these submatrices are collected into an overall scoring matrix \mathbf{B} . There are p item parameters, which are collected into a parameter vector $\xi=(\xi_1, \dots, \xi_p)$. The relationship between item responses and parameters is specified by a design matrix \mathbf{A} . This matrix is composed of design vectors \mathbf{a}_{ij} , each of length p , which, when multiplied by the parameter vector ξ , form a linear combination of the parameters operative for response j to item i . The probability of a response j to item i is then given by

$$P(X_{ij} = 1 | A, B, \xi | \theta) = \frac{\exp(b_{ij}\theta + a'_{ij}\xi)}{\sum_{k=1}^J \exp(b_{ik}\theta + a'_{ik}\xi)} \quad (4)$$

Data was collected from 409 Thai sixth-grade students in seven elementary schools in the northern and north-eastern regions of Thailand. This study employs four measurement models to investigate a sound model for assessing MPS relating to the modeling of items in the common open-ended question. These models consist of the Rasch model (Rasch, 1960), the partial credit model (Masters, 1982), Rasch models for item bundles (Wilson & Adams, 1995), and the MRCLM (Adams et al., 1997). The parameter are estimated using ACER ConQuest Version 2.0 (Wu et al., 2007). The model fit, reliability and item fit comparisons provide the evidence for selecting the model with the flexibility and appropriateness for assessment in a real-world context.

Results

Model fit and reliability comparisons

The fits of the various models are compared considering the difference in deviance between the two models. The resulting statistic is distributed as approximately the χ^2 , with degrees of freedom equal to the difference in the number of parameters in the two models. The information about the fit of the various models indicates that the MDB model fits the data significantly better than the two models at the $\alpha = .01$ level (see Table 1). Based on a comparison of Akaike's Information Criterion (Akaike, 1981), the MBD fits the data better than the MD and UD. Comparing the UD and MD models, however, the MD shows a fit that is significantly better at the $\alpha = .01$ level than the UD model ($\chi^2=63.826$, $df=5$). This result is at least suggestive that the MD is better than the UD model for these data. Regarding the reliabilities of the three models in the MPS data, under the MD model, the reliability for each dimension comes closer to the unidimensional reliability estimate than the MDB model, particularly the ST dimension. This result suggests that the MD model results in a higher reliability than the MDB model for these data. Nevertheless, in the case of the PC dimension in each model, the reliability is lower than the other two MPS variables. Moreover, in a bundle satuated model, the plain multidimensional model likely over-estimated the reliability (Wilson & Adam, 1995). The correlation between dimensions for each of the three models, in all three models, the correlations are high between dimensions are high, especially the correlation between the ST and RE. The correlations are very similar for both models.

Table 1. Model Fit Comparison, Reliability, and Correlation Estimates between Dimensions

Model Fit Comparison	AIC	Deviance	Number of parameters
1. UD	11726.257	11612.257	57
2. MD	11672.432	11548.432	62
3. MBD	11508.025	11378.025	65
Reliability	PC	ST	RE
1. UD		0.803 (all items)	
2. MD	0.710	0.710	0.710
3. MBD	0.677	0.677	0.677

Correlation Estimates between Dimensions	PC		ST
	1. MD	ST	0.861
	RE	0.874	0.887
2. MBD	ST	0.871	
	RE	0.875	0.895

Construct validity, Wright map comparisons

The person ability estimates and the item difficulty estimates from the MRCLM analysis can be summarized graphically using a Wright Map (Wilson, 2005). The results found that the Wright Map of the MD, and MBD models are very similar in the person ability estimates and the item difficulty estimates. Consequently, researchers decided to present the comparison between unidimensional and multidimensional constructs (see Figure 5). The Wright Map of unidimensional construct demonstrates that most items are generally inconsistent, particularly for some noticeable overlap in the levels and some surprisingly low threshold values in level 5. Specifically, Item 1,3, 4, and 5 have threshold estimates in level 5 that are easier than expected. The Wright Map displays the thresholds for each item step of the MD model that have been separated into dimensions such as PC, ST and RE. The Wright Map shows that most of all are generally consistent in this regard, except for some noticeable overlap in the levels and some surprisingly low threshold values in level 4 and 5 in PC dimension. Specifically, the PC (Item 2,4, and 5) items have threshold estimates in level 5 that are easier than expected.

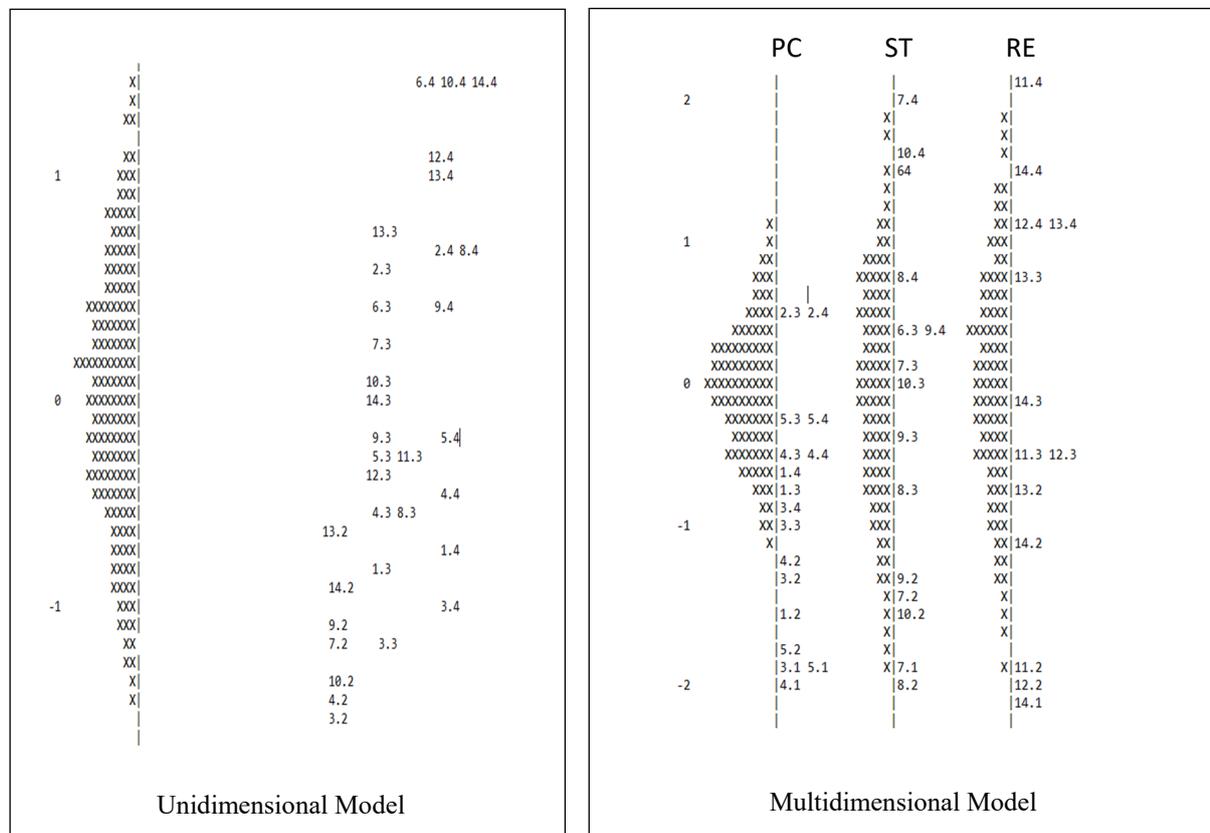


Figure 5: Wright Map Comparison between unidimensional and multidimensional models

Item fit

Regarding the weighted mean square fit statistics of the items for the three models, three out of the 14 items in the UD construct, i.e., Items 2, 5, and 13, have a weighted mean square fit statistic that falls outside the range of the 95% confidence interval (see Table 2). Out of these three items that have a significant misfit, there is one item (Item 5) that falls outside of the acceptable effect size range of 0.75 to 1.33. Considering the item fit of the other two models, however, only one or two of the 14 items in the two multidimensional models have a weighted mean square fit statistic that falls outside the range of the 95% confidence interval, and they are all from the original subset of three. Out of these items that have a significant misfit, all the items fall within the acceptable effect size range. This result is at least suggestive that the fit of the items of the MD construct is better than that of the UD construct for these data.

Table 2. Weighted Fit Statistics for the Fourteen Estimated Item Parameters of the Three Models

Dimension	Item	UD			MD			MBD		
		MNSQ	CI	T	MNSQ	CI	T	MNSQ	CI	T
PC	1	1.13 (0.83, 1.17)		1.5	0.99 (0.83, 1.17)		-0.1	0.92 (0.82, 1.18)		-0.9
	2	0.87 (0.88, 1.12)		-2.1	0.87 (0.89, 1.11)		-2.4	0.91 (0.87, 1.13)		-1.5
	3	1.07 (0.76, 1.24)		0.6	0.95 (0.76, 1.24)		-0.4	0.86 (0.76, 1.24)		-1.1
	4	1.07 (0.85, 1.15)		0.9	0.97 (0.85, 1.15)		-0.4	0.94 (0.85, 1.15)		-0.7
	5	1.51 (0.87, 1.13)		6.7	1.28 (0.88, 1.12)		4.1	1.29 (0.87, 1.13)		4.1
ST	6	0.97 (0.87, 1.13)		-0.4	1.06 (0.86, 1.14)		0.8	1.01 (0.86, 1.14)		0.1
	7	0.91 (0.84, 1.16)		-1.1	0.99 (0.85, 1.15)		-0.1	1.03 (0.84, 1.16)		0.4
	8	0.90 (0.87, 1.13)		-1.5	0.99 (0.86, 1.14)		-0.1	0.98 (0.86, 1.14)		-0.2
	9	0.88 (0.88, 1.12)		-2.0	0.96 (0.87, 1.13)		-0.6	0.98 (0.86, 1.14)		-0.3
RE	10	0.96 (0.87, 1.13)		-0.5	1.01 (0.87, 1.13)		0.2	1.01 (0.87, 1.13)		0.1
	11	1.01 (0.84, 1.16)		0.2	1.07 (0.85, 1.15)		0.9	1.11 (0.85, 1.15)		1.4
	12	0.99 (0.86, 1.14)		-0.1	1.05 (0.86, 1.14)		0.7	1.06 (0.86, 1.14)		0.8
	13	0.86 (0.87, 1.13)		-2.3	0.96 (0.86, 1.14)		-0.6	0.97 (0.86, 1.14)		-0.4
	14	0.90 (0.87, 1.13)		-1.5	0.96 (0.87, 1.13)		-0.6	0.99 (0.86, 1.14)		-0.1

Discussion and Conclusion

Results indicated an evidence that a three-dimensional model is more appropriate than a one-dimensional model. The unidimensional and multidimensional models ignore the violation of the local independence assumption. Thus, the item bundles model is the best fit for these data because this model is concerned with the violation of item local independence in cases in which students obtain several scores from a common open-ended question or task, and it does so by means of formulations that meet the independence requirement between the bundles rather than between individual items. Most importantly, researchers that the MD model is highly problematic concerning the high correlation between dimensions because it obtained several scores from a single student written response on multiple dimensions. Furthermore, results have shown that ignoring local dependence will, in general, overestimate the test information and reliability and thus underestimate the standard error of ability estimates. The resulting parameters must be interpreted with respect to the item bundle, rather than in terms of individual items (Wang, Su, and Qiu, 2014). Nevertheless, in this case, one aspect, a contrasting assumption, is that the correlations are very similar for both models. Moreover, the MBD model shows a fairly higher correlation matrix than the MD model. These results indicate that the assessment design can use the simple multidimensional model for representing a complicated model, such as those described by Wilson and Adams (1995) and Arnesona (2015), in which the saturated bundle model is not a feasible strategy to use for assessing polytomous items.

In conclusion, the results of the two multidimensional models have very similar values in terms of the reliabilities (EAP) and correlation matrix, especially the weighted fit statistics. Regarding its use in the real-world situation, the MD model is a more adequate explanation than the explicit MBD models. At an interpretative level, the MD provides richer information to the classroom teacher about the MPS of students than the UD model. However, the correlations between the ST and RE competencies are closely related. The ST construct levels capture students' ability to choose and use strategies for representing the algorithm and notation that reflects familiar or unfamiliar problems, whereas the RE construct levels focuses on the quality of students' demonstration of logical reasoning with strong explanations that include both clear text and proper mathematical notation. The scoring of these dimensions is not clear and explicit in some open-ended tasks. In some situations, using logical reasoning is the best strategy of all for meeting higher-level expectations. Students can demonstrate the ability to move from concrete to abstract representation. Future research is necessary to examine and compare the fit of the model after reducing the number of dimensions assessed by combining the ST and RE. Moreover, this study did not investigate the amount and types of items in the common open-ended questions with appropriation for using the item bundles model. Further analyses should demonstrated the magnitude of the bundle effect that impacts the parameter estimates and test precision.

References

- Adams, R. J., Wilson, M., & Wang, W. (1997). The multidimensional random coefficients multinomial logit model. *Applied Psychological Measurement, 21*, 1-23.
- Akaike, H. (1981). Likelihood of a model and information criteria. *Journal of Econometrics, 16*, 3-14.
- Allen, D. & Wilson, M. (2006). Introducing multidimensional item response modeling in health behavior and health education research. *Health Education Research, 21*, 174-184.
- Amesona, A. (2015). *An example investigation of multidimensional testlet models*. Unpublished manuscript, University of California at Berkeley, California, USA.
- Arieli-Attail, M. & Cayton-Hodges, G. (2014). Expanding the CBAL™ mathematics assessments to elementary grades: The development of a competency model and a rational number learning progression. *Educational Testing Service No. RR-14-08*, Retrieved from <http://search.ets.org/researcher>.
- Black, P., Wilson, M., & Yao, S-Y. (2011). Road maps for learning: A guide to the navigation of learning progressions. *Measurement: Interdisciplinary Research and Perspectives, 9*(2-3), 71-122.
- Briggs, D. C. & Wilson, M. (2003). An introduction to multidimensional measurement using Rasch models. *Journal of Applied Measurement, 4*(1), 87-100.
- Draney, K., Yamada, H., & Xie, Y. (2000). *Cross-dimensional item bundling*. Unpublished manuscript, University of California at Berkeley, California, USA.
- Hickendorff, M. (2013). The language factor in elementary mathematics assessments: Computational skills and applied problem solving in a multidimensional IRT framework. *Applied Measurement in Education, 26*(4), 253-278.
- Jones, I., Swan, M., & Pollitt, A. (2014). Assessing mathematical problem solving using comparative judgment. *International Journal of Science and Mathematics Education, 13*(1), 151-177. doi: 10.1007/s10763-013-9497-6
- Masters, G. N. (1982). A Rasch model for partial credit scoring. *Psychometrika, 47*, 149-174.
- Ministry of Education. (2008). *Basic education core curriculum B.E. 2551 (A.D. 2008)*. Bangkok, Thailand: Kurusapa Ladprao.
- National Council of Teachers of Mathematics (NCTM). (2000). *Principles and standards*. Reston, VA: NCTM.
- Rasch, G. (1960). *Probabilistic models for some intelligence and attainment tests*. Chicago, IL: University of Chicago Press.
- Stylianou, D. A. (2013). An examination of connections in mathematical processes in students' problem solving: Connections between representing and justifying. *Journal of Education and Learning, 2*(2), 23-35. doi: 10.5539/jel.v2n2p23
- Wang, W. C., Su, C. M., & Qiu, X. L. (2014). Item response models for local dependence among multiple ratings. *Journal of Educational Measurement, 51*(3), 260-280.
- Webb, N. L. (1998). Thoughts on assessment in the mathematics classroom. In G. W. Bright & J. N. Joyner (Eds.), *Classroom assessment in mathematics: Views from a National Science Foundation working conference* (pp. 101-114). Lanham, MD: University Press of America.
- Wilson, M. (2005). *Constructing measures: An item response modeling approach*. Mahwah, NJ: Lawrence Erlbaum Assoc.
- Wilson, M. & Adams, R.J. (1995). Rasch models for item bundles. *Psychometrika, 60*, 181-198.
- Wilson, M. & Sloane, K. (2000). From principles to practice: An embedded assessment system. *Applied Measurement in Education, 13*(2), 181-208.
- Wu, M. L., Adams, R. J., Wilson, M. R., Haldane, S. A. (2007). *ACERConQuest Version 2: Generalized item response modeling software*. Camberwell: Australian Council for Educational Research.
- Youngchim, P., Pasiphol, S., & Sujiva, S. (2015). Development of a mathematical problem solving diagnostic method: An application of Bayesian Network and multidimensional item response theory. *Procedia-Social and Behavioral Science Journal, 191*, 742-747.

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Monitoring And Enhancement Of Students' Performance For Holistic Development In A Civil Engineering Technology Programme

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Abstract

Students, being the ultimate asset of any institutions of higher learning, need to have their performance carefully monitored and their potential effectively developed while enrolled in the respective academic programmes. This paper describes the established workflow and system for an undergraduate Civil Engineering Technology programme in a public university, from admission right up to the completion of study. At the input end, it highlights the intricacies of enrolment of students from different academic background requiring credit articulation. Once enrolled, the students' academic performance is continuously monitored in accordance with the stipulated learning outcomes per course every semester, which cumulatively add up to the attainment of Programme Outcomes or POs outlined in the Sydney Accord for bachelor's degree in engineering technology. Also included in the discussion is the students' workload over the 4-year programme duration, where balanced distribution of the student learning time (SLT) for the 140 credit-hour programme is presented. In addition, explanation is given on the engagement of extra-curricular activities to hone the students' soft or employability skills not covered in classes, as well as the counselling and talent management services available for the students at zero costs. Finally, arguably the most important component of the management system, i.e. maintaining enthusiasm and motivation of the students, is illustrated with efforts to keep the students' interest intact via various innovations, catering for the myriad learning aptitude, styles and preferences. All in all the holistic development of the students as "humans first and professional second" is embodied in the performance monitoring and enhancement system, with real-time track-keeping of individual student's academic and non-academic accomplishment towards graduation.

Keywords: *Learning outcomes, performance monitoring, workload, student learning time, extra-curricular activities, employability skills*

Introduction

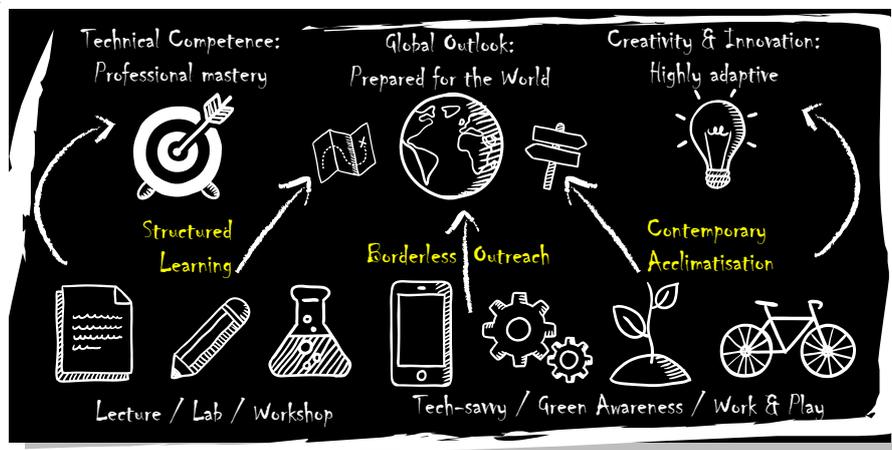


Figure 1: Holistic development to cultivate global technical professionals.

Modern day higher education demands that imparting hard, technical knowledge and skills alone is no longer adequate to provide graduates with a smooth transition to the job market. On the other hand employers have almost always raised concerns on the lack of work-readiness among fresh graduates (Pollard *et al.*, 2015), often relating to poor communication skills and unfavourable mannerisms or attitude. Also, employability concerns and teaching of the related skills are sometimes considered additional chores in the academia on top of the expansive syllabus (Powell, 2010), where the additional time and effort required is perceived to hamper actual teaching in universities (Clegg & Bradley, 2006). Gaping distance between the academia and industry could inadvertently lead to low level of understanding and awareness on the needs, issues and challenges for generic skills development among students too (Chan *et al.*, 2017). Nevertheless, from the students' perspectives, awareness of the importance of soft skills in the work or career context has not gone unheeded (Passow, 2012), with conscious effort being expanded to equip themselves for working life. On the whole, universities are expected to be a training ground to cater for the functional character-building of students, a typical form of

which is shown in [Figure 1], i.e. a balanced development of academic competencies as well as non-academic supporting skills.

Irrespective of the on-going debate and disparity in opinions, the University remains committed to provide the best higher education of an all-encompassing nature to students enrolled in the various academic programmes. This paper elaborates on the performance monitoring and enhancement system developed and implemented at the University for an undergraduate Civil Engineering Technology programme. The specific functions and features of the respective systems are summarised in [Figure 2], of which each component is examined in the following discourse.

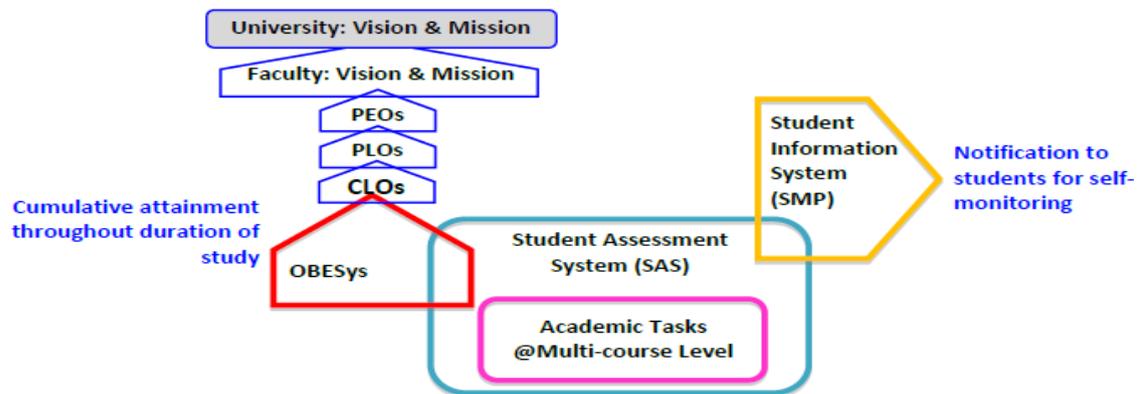


Figure 2: Integrated online systems for real-time data capturing and monitoring of students' performance.

Students' Performance: Measurement

Measurement of Students' Performance per Programme Outcomes (POs)

Students' performance in relation to Programme Outcomes (POs), or more commonly known as PLOs at the Faculty, is analysed using an integrated online system which mainly consists of:

- i) Students Assessment System (SAS)
- ii) Outcome Based Education System (OBESys)

The specific functions and features of the respective systems are summarised in [Table 1].

Essentially, SAS is linked to the Total Campus Integrated System (TCIS). TCIS is an online system which integrates necessary information of personal, teaching and learning activities of each individual staff, both academic and supporting staff. The course coordinator is responsible for input of the mark weightage for continuous or formative (quizzes, assignments, laboratories, workshops, projects and tests) and summative (final examination) assessments. With that, respective lecturers of a particular course can key in the marks as per the weightage preset by the course coordinator. Once the marks for each component have been keyed in, analysis can then be carried out on the attainment of CLOs. With the attainment level of CLOs determined, the respective related PLOs can next be ascertained.

In addition, with the linkage between SAS and SMAP (Sistem Maklumat Akademik Pelajar) on-line, overall marks of both continuous assessment and the final examination can be analysed to measure the CLOs and PLOs attainment. The integrated system allows the student to monitor their grades online too. Also, both lecturers and the Faculty's management personnel are able to monitor and evaluate the students' academic performance on a real-time basis. OBESys is linked to SAS as an instrument to capture the cumulative attainment of POs as a student progresses through the semesters. As SAS keeps tab of the fulfilment of CLOs per course, the timebased contribution of the respective CLOs to the POs can be monitored based on the predetermined CLO-PO mapping. In addition, OBESys enables the attainment of POs to be analysed per individual student or cohort, making the measurement of students' performance at both the macro and micro level simple and possible.

In the current practice, learning outcomes for each course (CLOs) are mapped to the respective programme learning outcomes. At the end of the semester, the attainment of CLOs for each course is measured through SAS. Once the programme completes a full cycle of implementation, the final POs' attainment can be readily measured. Note too that the Faculty is committed to the Key Performance Indicator (KPI) of each PLO to be 60%, where students' achieving less than 60% in the assessments will be subjected to corrective measures for future improvement.

Table 1: Summary of functions and features of the integrated online systems.

No.	System	Basic Function	Features
1.	SAS	Keeps record of Continuous Assessment and Final Examination	- Online system linked to TCIS - Systemized compilation of courses' assessment
2.	OBESys	Student's Outcome Based Learning Assessment	- Online system linked to TCIS - Analysis of CLOs' attainment - Analysis of PLOs' attainment - Continual Quality Improvement (CQI)

Students' Workload

The Programme curriculum structure has been designed to ensure that student's workload is appropriate and effective as per the student learning time (SLT), where students are not overburdened with academic activities but have adequate quality time to participate in extracurricular activities for cultivation of soft skills and character-building in general. The students' workload is calculated based on the allocated credit of each course. Each credit weighs 40 notional hours SLT per semester, which includes face-to-face and non-face-to-face learning such as lectures, tutorials, laboratory works, projects, field works, practicum or other academic-related activities.

Students who graduate on within the stipulated period would have spent a total of 8 semesters with an accumulated total credit hours of 140. This includes 12 credits for Industrial Training in the final or 8th semester of the final year of study. The distribution of credits and SLT hours per semester for an academic year is shown in [Table 2].

As indicated in [Table 2], a student is expected to spend approximately 480 - 760 hours (12 – 19 credits) SLT per semester or equivalent to 20 to 54 hours SLT per week. On the credit load for one semester, students are advised to register no more than 18 credit hours per semester. However registration of 19 to 21 credits is permissible by the Regulations only with the Dean's approval. The written approval must be attached during course registration for the semester. The academic workload for each course must be clearly specified in the Lecture Plan, including all activities and assessment for the respective course.

Table 2: SLT hour distribution for the Programme.

Year of Study	Semester I			Semester II		
	Credit	SLT Hour per Sem	SLT Hour per Week	Credit	SLT Hour per Sem	SLT Hour per Week
1	18	720	52	18	720	52
2	19	760	54	19	760	54
3	18	720	52	19	760	54
4	17	680	49	12	480	20

As part of the good practices of CQI, recommendations made for future improvement of a particular course can be retrieved from the OBESys and implemented for the current semester, hence closing the loop of translating feedbacks into useful feedforwards for the course per se. The Lecture Plan would be submitted to the Faculty before the commencement of the semester, a requirement as prescribed in the Teaching Appointment Letter for each course lecturer.

Engagement In Extra-Curricular Activities

To nurture an ideal graduate with the ability to lead a balanced professional and personal life upon graduation, academic prowess must be grounded with ethical and moral values, and complemented by good judgement and common sense. It is compulsory for UTHM students to choose any two co-curriculum courses on offer throughout their period of study, where each course carries a 2-credit hours. In addition, students are encouraged to participate in various non-academic activities organized by the sport clubs, uniform bodies and cultural societies. Students are also encouraged to take part in competitions and organized cultural visits, and to attend seminars, talks or workshops to enhance their understanding of topics beyond the Programme, to hone their soft skills as well as to enlarge their social circle and networking for beneficial ends.

There is a variety of activities organized throughout the semester to meet the different interests and preferences of the students. For instance, the UTHM Sports Unit organizes intervarsity sport events, Staff and Students Sports Carnival, Residential College Sports Carnival and other jointly organized sporting events and tournaments. The Cultural Unit, on the other hand, runs activities concerning music, singing, dancing and theatre with rich Malaysian flavours for the benefit of both local and international students. The University also continuously strives to provide a conducive environment (facilities and services) to maintain students' enthusiasm and motivation throughout the academic years. Facilities available such as state-of-the-art library, student dormitories, buses, sports facilities through the Curriculum, Sports and Culture (PKSK), University Health Center (PKU), bank services, mosque, Centre of Counselling and Student Development (PKPP), Office of Student Affairs (HEP), Centre for Graduate Studies, International Office and others.

To inculcate a sense of independence and leadership among students, the University encourages students to share ideas and propositions for activities to narrow the gap between the students' preferences and the University's often conservative ideas that mean well but may not necessarily suit the temperament of the generation. The activities are generally organized under registered societies or associations as approved by HEP. At the Faculty level, the students' activities are in general managed by the student club, i.e. Engineering Technology Club (ETeC). ETeC has organized a number activities of academic and non-academic nature. An example of a non-academic programme organized by ETeC is the outbound mobility to Perth, Australia. At the Department level, several Technical Visits have been organized to widen the students' learning sphere as well exposure to the industry. These include the visits to Kualiti Alam and the Public Works Department. In addition, Corporate Social Responsibility (CSR) programmes are periodically arranged to develop the students' social awareness, civic-mindedness and sense of volunteerism via engagements in activities related to their fields of study. The Solid Waste Management and Composting programme as well as the Residential House Fixing and Repairing activity constitute 2 of the events. University-wide students' activities are primarily under the care of the Student Development Centre (P3P), carried out as part of the Students' Development Programme (PROPEMP) for all. The activities include ETEC4U, Hike Tech and *Program JatiDiri*.

Counselling And Advisory Services

The Student Development Centre (P3P) is led by two main units at the University, namely the Careers Department and the Counselling Department, and assisted by the general administrative unit. The main goal of P3P is to assist in personality development and soft skills cultivation among students by honing and sharpening their potential. P3P essentially provides opportunities for students to identify and nurture their respective talents for academic performance and future career interests. Counselors of recognized expertise and experience play the role of facilitating and guiding students while serving as a source of inspiration for students to excel through the programmes on offer. Details of the activities can be referred to at <http://p3p.uthm.edu.my/v2/>.

The Centre is also responsible for providing face-to-face counselling and e-counselling services. The counselling sessions are professionally conducted and free of charge, with ensured confidentiality and privacy of the students (**Appendix C4-6a: PSP- 9 Counselling Session Procedure**). Apart from assistance to be mentally prepared to fare well in the current academic work, students can also request for career advices and guidance as early preparations for their future engagement, such as preparation for job interviews and aptitude tests via specially organised recruitment or career fairs and employer presentation sessions. In addition, the Centre regularly conducts counselling clinics, career galleries and exhibitions as well as counselling research studies and publications. All in all the services by P3P can be summarized as follows:

- i) Provide guidance and professional counselling to individuals or groups so that the students can handle the problems/obstacles to balanced and brilliant.
- ii) Assist students to solve the problem of academic, personal, social and career.
- iii) Equip students with information, knowledge and experience related to the physical, emotional, spiritual, intellectual and social development so that they acquire academic excellence and character.
- iv) Implement development programmes to all the students.
- v) Implement programmes of academic guidance to students.
- vi) Implement programmes to improve self to all the students.
- vii) Administer psychological tests to the students

Some of the main events organized by the Centre as listed in [Table 3] clearly illustrate the diversity of engagement available to meet the needs of students in terms of self-development and mental wellbeing. Alternatively, students can always refer to their respective Academic Advisors in person or via the PA online system at e2.uthm.edu.my/ppa/pa/online, the Head of Department or the Deputy Dean of Students' Affairs and Alumni at the Faculty for advice and assistance pertaining to academic or non-academic matters. In a nutshell,

students are given every access to assistance and guidance for their wellbeing at the University, whether on matters of academic or personal nature. This is all part of the University's aspiration to provide a vibrant, conducive and exciting learning environment to spur the students towards excellence.

Table 3: Programmes conducted by the Student Development Centre (P3P).

No	Programmes
1.	Starting School (Appendix C4-6b)
2.	Attitude Grooming
3.	Community Engagement
4.	Intermediate School
5.	Students Mobility
6.	My 3S
7.	Career Fair
8.	Graduate Employability
9.	Finishing School

Maintaining Students' Enthusiasm And Motivation

The learning experience at the University is enhanced through the implementation of a variety of channels, such as e-learning, Problem-based Learning (PBL), Full Online Classroom (FOC), Massive Open Online Courses (MOOCs), fieldwork and others. These innovations are adopted to facilitate meaningful learning for the students covering a wide spectrum of aptitude and learning styles. Indeed, the different approaches open up a diversified learning experience for the students, allowing them to identify and enhance their personal learning pace and preference for the most effective results. The diversity in delivery of lessons also train students to be adaptive and flexible in their receipt, processing and integration of newfound knowledge. Such versatility would certainly serve them well as graduates in the marketplace upon graduation.

A recent installation, the Centre for Global Online Learning UTHM (CGOL) was established with the specific aim to plan, coordinate and monitor the development and implementation of various initiatives for e-Learning at the Faculty and University level (<http://global.uthm.edu.my/uthmmooc.html>). The Centre also facilitates the implementation of Massive Open Online Courses (MOOCs) where students can access the course materials anywhere and anytime through <https://www.openlearning.com/malaysiamoocs> website. This is evident of the University's effort to keep abreast of the latest trending in tertiary education at the global arena, where physical boundaries are dissolved and co-sharing of resources are made possible with advanced internet access. Students of the digital generation surely appreciate the 'speed of things' to facilitate their learning.

Understandably the current open access to various learning resources require students to become more actively involved and personally responsible for their own learning. The seek for knowledge is no longer restricted to printed books and articles but expanded to online academic or research forums and blogs keeping real pace with the latest development of the field area. Internet access is rudimentary and the University is constantly upgrading its services to cater for the students' needs. With a fast and smooth access to the internet, students are assured of less hiccups in information searching and retrieval, giving them more time to dissect the information for in-depth learning. Such advantages and efficiency in time management inadvertently encourage students to be more driven for academic excellence.

Moreover, several funding is available for students to finance their studies. The main financial support comes from the *Perbadanan Tabung Pendidikan Nasional* (PTPTN). Apart from PTPTN, students can also apply for scholarships awarded by the Ministry of Education, Public Services Department, State Governments, other Government Agencies as well as private companies. The University also provides financial assistance to students who are facing financial difficulties by using a special fund from Student Affairs Office. Furthermore, two-way interaction between lecturers and students is keenly encouraged to improve the students' academic performance and to enrich their learning experience. Examples of these exercises include impromptu Q&A sessions in class, short sub-topical discussions and brainstorming sessions, pop quizzes conducted verbally in class, among others. Also, timely assessment of submitted work with constructive feedbacks by the lecturers is crucial for the comments to be incorporated in future work for continuous improvement of the students. This active and consistent feedback mechanism helps students to stay focused on their studies while steadily making progress in their learning of the subject matter. Maintaining such positive outlook of learning would help students to persevere as they ascend the learning curve of the Programme as a whole.

The implementation of Problem-based Learning (PBL) does not only engage students in the application of theories and principles in actual field problems, but stimulate them to think outside the box to resolve technical problems often requiring a combination of several solutions. PBL also gives students the opportunity to work in

groups, inculcating the spirit of teamwork and developing leadership, simultaneously sharpening a number of other soft skills like communication, critical thinking, information management, social awareness and responsibilities, professional ethics and moral boundaries. The close-knit group settings simulate real-life working environment, where students learn through alternating role plays as both leader and team member, sharing the workload, materials, resources and ideas for the success as one. Such deviation from the conventional individual assignments undoubtedly makes learning more fun and interesting for the students, garnering better enthusiasm and motivation in healthy competition among their peers. Last but not least, other than the activities describe in section 4.5, other extra-curricular activities known to improve students' motivation and enthusiasm include the industrial talks and seminars organized at Faculty and Programme levels, UTHM Starting School Program and Dean's List Award Ceremony.

Conclusions

The Faculty and University aspire to groom and develop graduate engineering technologists who are all-rounders, equipped with sound technical competencies and essential employability skills of the 21st century. Aligned with the maxim of "humans first and professional second", the continuous students' performance monitoring and enhancement system ensures a structured process of character-building throughout a student's 4-year course of study, intricately weaving professional mastery with non-academic but necessary skills to thrive upon graduation, in life and their respective careers.

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References

- Chan, C.K.Y., Zhao, Y. & Luk, L.Y.Y. (2017). A validated and reliable instrument investigating engineering students' perceptions of competency in generic skills. *Journal of Engineering Education*, vol. 106, no. 2, (pp.299-325).
- Clegg, S. & Bradley, S. (2006). Models of personal development planning: Practice a process. *British Educational Research Journal*, vol. 32, no. 1, (pp.57-76).
- Passow, H.J. (2012). Which ABET competencies do engineering graduates find most important in their work? *Journal of Engineering Education*, vol. 101, no. 1, (pp.95-118).
- Pollard, E., Hirsh, W., Williams, M., Buzzeo, J., Marvell, R., Tassinari, A., Bertram, C., Fletcher, L., Artess, J., Redman, J. & Ball, C. (2015). Understanding employers' graduate recruitment and selection practices. *Institute for Employment Studies (IES), UK*.
- Powell, J. (2010). Useful or just another fad? Staff perceptions of personal development planning. *Journal of Learning Development in Higher Education, Special Ed., Research PDP Practice*, (pp.1-15).

Moolc Design And Development Process For An Agglutinative Language: "Türkçe Öğreniyorum" Case

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Abstract

Massive Open Online Courses (MOOCs) provides individuals with flexible, affordable, self-paced learning opportunity with fast-track completion option. "Türkçe Öğreniyorum (Learn Turkish)" is an example of a well-prepared language MOOC for the teaching of Turkish at A1 level. Although MOOCs have a decade of history and expanding literature, designing efficient language MOOCs is a relatively new era and has limited research. In this study, design and development know-how of "Türkçe Öğreniyorum (Learn Turkish)" will be shared to contribute filling the gap in the field of designing and developing MOOLC for an agglutinative language.

Keywords: MOOLC, MOOC, agglutinative language, Turkish, language, language learning, design, development, know-how

1. Introduction

In the last decades, various distance and open learning programs and online educational delivery models have been developed to address access, affordability, and personalized learning in higher education (Hill, 2012). Nowadays with the advent of Massive Open Online Courses (MOOCs), new online educational models have emerged that promise to offer flexibility, affordable access and fast-track completion for free or at a low cost for whoever is interested in learning (Yuan & Powell, 2013). In fact, MOOCs support the idea of distributed intelligence and lifelong learning, open learning, open educational resources and represent a new generation of online education that encourages the development and delivery of courses that are massive, open, participatory (Perifanou, 2016). In the last decade, MOOCs have diversified in the context of different design approaches, goals and types of interaction. The concept of MOOLC is also one of these MOOCs types. MOOLC is basically defined as MOOCs with customized designs for language learning.

Language MOOCs as an evolving and expanding area with new developments likely to offer a greater variety of courses and more innovative social learning pedagogies (Perifanou, 2014). Currently, practitioners, language teachers, instructional designers are exploring how to design efficient language courses that have the characteristics of open access and massiveness. On this basis, design and development know-how of "Türkçe Öğreniyorum (Learn Turkish)" MOOLC is presented in this study as an effort of experience sharing.

2. "Türkçe Öğreniyorum (I learn Turkish)" MOOLC

There is an increasing demand for learning Turkish as a foreign language over the last decade (Bayraktar, 2005; Büyükkız & Hazırcı, 2013; Yahşi Cevher & Güngör, 2015). Teaching Turkish as a foreign language abroad is coordinated by Yunus Emre Institute (YEI). According to YEI's annual report, 12.000 students were enrolled in courses offered by YEI to learn Turkish, and the number of students who took elective Turkish language courses in schools reached 8.000 (Yunus Emre Institute, 2016). The number of foreign students in Turkish higher education institutions is 125030 in the 2017-2018 academic year (The Council of Higher Education, 2018), and the number of those in primary and secondary education is 232714 (İBGİGM Migration Report, 2016: 43). According to Migration Authority, the number of foreigners in Turkey who has with a residential permit is 718297 as of August 2018. However, current digital learning materials are very limited in terms of both quality and quantity, and far from fulfilling this demand. There is a large gap especially in providing self-paced materials. There is two traditional distance education programs, and a comprehensive, well-structured, non-profit MOOLC. Distance education programs are provided by Anadolu University and Yunus Emre Institute, where the MOOLC is provided by Yasar University under the name of "Türkçe Öğreniyorum (I learn Turkish)".

The objective of "Türkçe Öğreniyorum" Project is to develop a worldwide distance learning platform, which is sensitive to individual differences and can differentiate the content according to the needs of the learner. The primary goal of "Türkçe Öğreniyorum" is to provide continuous access to qualified self-paced learning materials

for the Turkish language. It was developed under "the Differentiated Distance Education of Turkish as a Foreign Language" project, supported by TÜBİTAK with the project code of 115K270. It is limited by level A1, which is referenced in the Common European Framework of Reference for Languages

In "Türkçe Öğreniyorum", there are 53 chapters, each chapter bearing 5-minute lecture videos, 2-minute real-life drama videos, reading-listening-writing-pronunciation activities, approximately 40 games, one A1 level dictionary containing 1.500 vocabulary, approximately 6000 questions in total, a dictionary of rules, one forum and a virtual meeting application. Approximately 40.000 words of text in Turkish translated into English, Arabic, Russian and French language to offer support to learners. "Türkçe Öğreniyorum" runs on Sakai LMS, which is integrated with Kaltura Video Platform and Google Analytics. Learning analytics data is gathered from Diagnostics tool, Motivational Beliefs and Self-Regulated Learning Strategies Questionnaire (MLSQ), Logs of exercises, LMS Statistics, and Google Analytics. Diagnostics tool covers demographic information of learners, their primary and secondary languages, prior knowledge of Turkish, and home country. The aim of this tool is to collect data about learner profile in terms of the region they live in and the language they speak. MLSQ is used to detect cognitive and affective readiness of the learner in terms of intrinsic value, test anxiety, cognitive strategy use, and self-regulation (Pintrich & DeGroot, 1990). Logs of exercises record activity events of the learner (number of tries, given responses etc). Sakai CLE collects site usage statistics regarding learner visits, tool activity, and resource activity. Google analytics provides a rich source of data such as learner preferences (demographics, interest, age, geo, etc.), time spent on modules, page statistics (page view, page exits, behavior flow, etc.), preferred technology (device, browser, operating system, screen resolution, screen colors, etc.), video events (video view duration, numbers of play, pause and skip attempts, etc.).

Project team contains 2 instructional designers, 4 subject matter experts, 1 graphic designer, 1 video developer, 1 multimedia developer, 1 photographer, 1 system administrator, 1 software developer, 4 translators, 7 actors, 6 voice actors, 3 cameramen, 2 production specialists, 2 post-production specialists, 1 cinema director, 1 scriptwriter, 1 assessment and evaluation specialist and 2 consultants.

ADDIE [Analysis, Design, Development, Implementation, Evaluation; (Morrison et al., 2010)] was used as an instructional systems design model.

3. Analysis Phase

The main objective of the project is to provide flexible learning opportunities and continuous access to qualified self-paced learning materials. The central concern of the project is to differentiate the content according to the needs of the learner. Therefore, our focus in this phase was on diagnosing the learner profile and the explore most common linguistic errors they made to examine who struggles in which topics. A registration form -which contains gender, age, nationality, residency, mother language, the number of foreign languages that learner knows, education level, employment status, internet usage habits, reasons of learning Turkish, prior knowledge of Turkish - created to define learner demographics. In addition, one focus group discussion conducted, and 177 A1 level writing exam papers were analyzed. Focus group discussion conducted with 8 international students from China, Pakistan, Malaysia, Nigeria, India, Serbia and Bosnia who participated voluntarily. Learners were asked to share their experiences of learning Turkish, reasons of learning Turkish, the differences and similarities between their own cultures and Turkish culture, commonly used methods for learning Turkish, and what features a language MOOC should have. A1 level writing exam papers of 177 learners were analyzed to diagnose learners' needs. Linguistic error analysis techniques were used for error analysis. According to results, there was a relationship between error frequency and learner group (Arabic-Farsi, Turkic, Balkan and Other). The errors density varied as a function of the learner group. Therefore, it was decided that differentiation for teaching Turkish as a foreign language should be made according to learner group on the topics which they have high errors density.

4. Design Phase

In the design phase, the design of interfaces, content structure, lessons, assessment and evaluation processes, support and communication tools were performed.

4.1. Design of interfaces

This phase covers the interface design of the web page and Learning Management System (LMS). Graphic designers and researchers worked together in this step to design the web page, Figure 1, and customize Sakai CLE LMS's user interface, Figure 2.

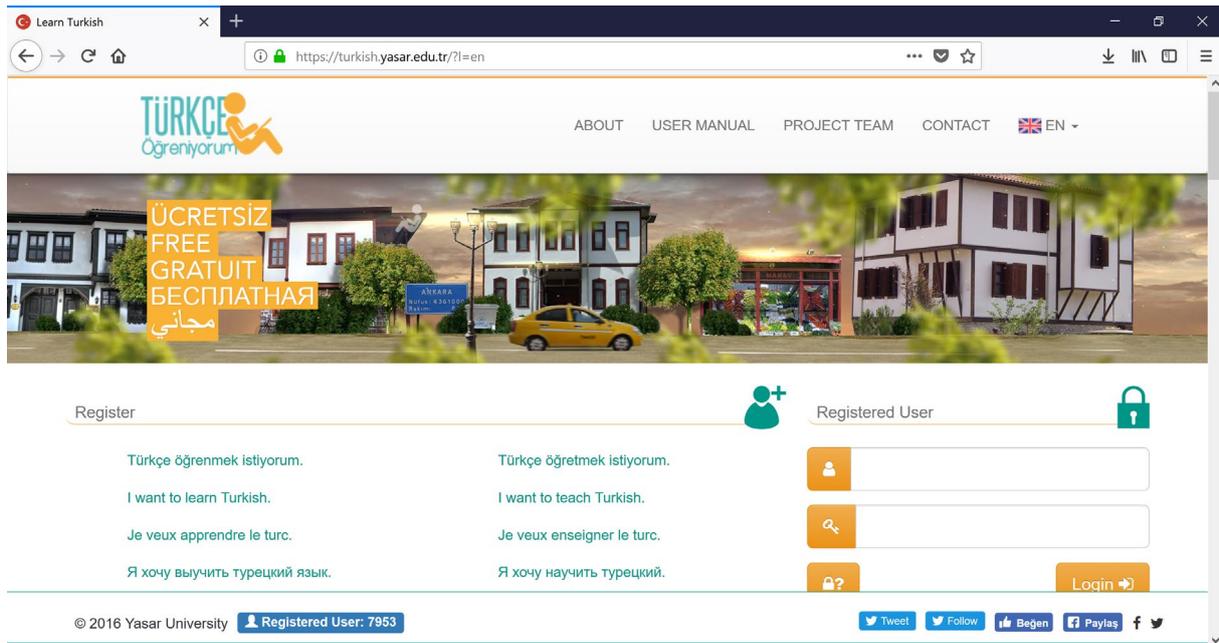


Figure 1: Web site Interface of "Türkçe Öğreniyorum"

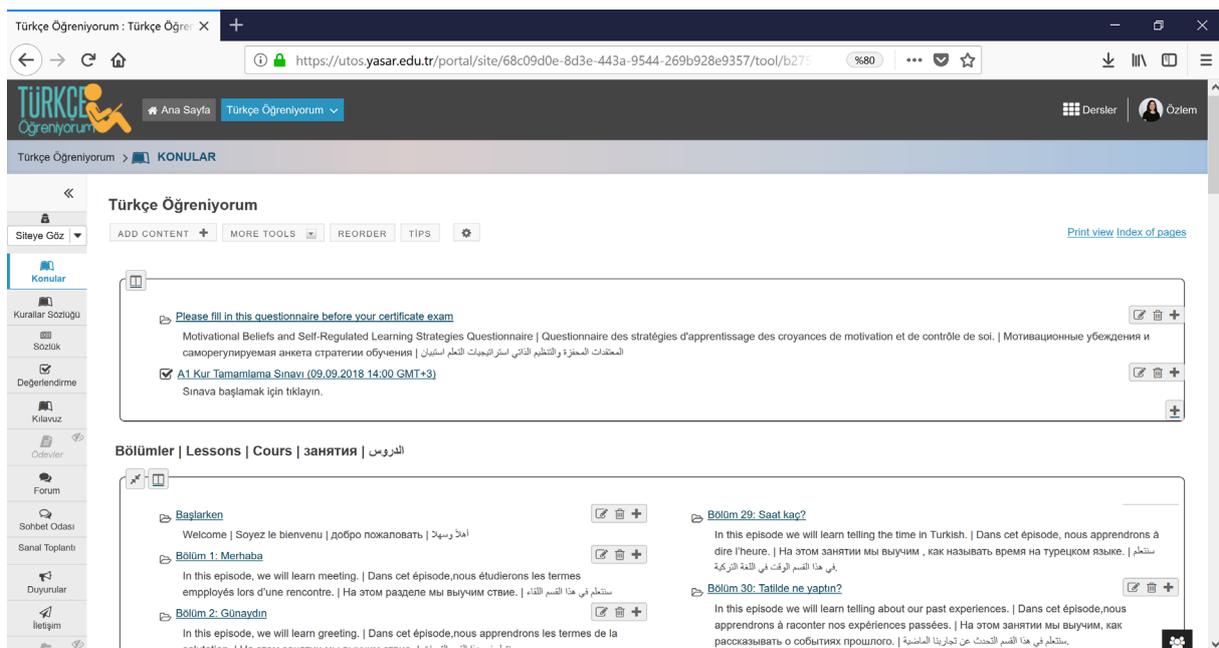


Figure 2: Customized Sakai LMS user interface of "Türkçe Öğreniyorum"

In the design process, green and orange colors were chosen for web interface and logo since green color has a strong association as a refreshing and peaceful color and orange is the color of joy, creativity, sense of general wellness and emotional energy, and warmth.

4.2. Designing structure of content

Structure of content of "Türkçe Öğreniyorum" was based on five theoretical approaches. First one is the theory of transactional distance, which establishes a relationship between dialog, structure, and learner autonomy (Moore, 2007). Second one is theory of self-regulatory learning, which is critical especially in distance education because of the absence of the very active role of the instructor and the requirement for high-autonomy (Hsu et al., 2009), goal setting, self-monitoring, self-evaluation, use of task strategies time planning and management (Dabbagh & Kitsantas, 2005). The third one is the Theory of Multimedia Learning (ToML). Forth one is Tomlinson's (2001) approach for differentiation of instruction. The final one is Notional-Functional Approach (Ellis, 2005; Halliday,

1986; Hymes, 1971) as second language teaching theory as shown in Figure 3. Based on this theoretical framework, "Türkçe Öğreniyorum" system consists of 53 lessons/modules. In addition, it comprises Dictionary, Dictionary of Rules, User Guide, Forum, Virtual Meeting and Certificate Exam Tool.

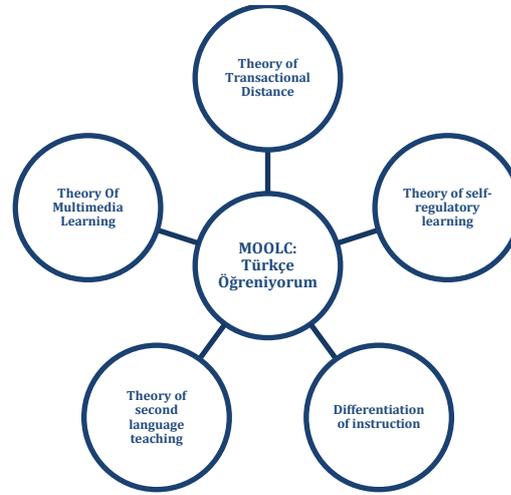


Figure 3: Theoretical background of "Türkçe Öğreniyorum" MOOLC

In this stage, the learning environment, constraints, the delivery options, and the timeline for the project were also considered. After a systematic process of specifying learning objectives, detailed storyboards and prototypes were done. The user-interface, content and learning materials determined based on the design phase was produced at the development phase.

Learning materials are designed and developed for target groups of learners. Course difficulty is pitched to the group's educational level, and examples or exercises are selected from the learner's environment. Materials obtained through collaboration with other institutions. Although the basic content of shared teaching and learning materials stays the same, the examples, arguments or explanations is adapted to differentiate depending on the learner group. All shared resources are reviewed to determine what changes are needed and supervise adapting the resources to the needs of learner groups.

3.2. Designing Lessons

Each lesson contains approximately 5 minutes of lecture video with relevant grammatical information, drama videos designed in the context of 1-2 minutes of daily dialogue, activities involving exercises and games to reinforce the learned subject, a book chapter end test that allows the learner to self-evaluation components, Figure 4.

Türkçe Öğreniyorum Ana Sayfa Türkçe Öğreniyorum Dersler Yaşın

Türkçe Öğreniyorum > **KONULAR** > Bölüm 4: Alfabe Geri İleri

« **Bölüm 4: Alfabe** [Yazdırma Görünümü İ İndekiler

TR EN RU FR AR

Bu bölümde Türkçedeki harfleri öğreneceğiz.

[Kitap](#) | [Book](#) | [книга](#) | [livre](#) | [كتاب](#)
Kitap bölümü 4: Alfabe

Dinle ve Seç

Dinle ve Görseli Seç

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[Konuş](#) | [Speak](#) | [Говорить](#) | [Parle](#) | [تكلّم](#)
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[Sırala](#) | [Put in Order](#) | [Сортировка](#) | [Range](#) | [الترتيب](#)
Diyalog sıralama

[Bul](#) | [Find](#) | [Найти](#) | [Trouve](#) | [البحث](#)
Kelime bulmacası

[Oyna](#) | [Play](#) | [Играть](#) | [Joue](#) | [اللعبة](#)
Bölüm oyunu

Kendini Değerlendir | [Assess Yourself](#) | [оценивать себя](#) | [évaluez vous](#) | [تقيم نفسك](#)
Bu sınavda 10 soru vardır. Bu sınavda süre kısıtlaması yoktur. Bu sınavı yeniden yapabilirsiniz.

GERİ İLERİ

Figure 4: Course structure

For each section, the learning objectives are determined firstly. In line with the objectives, raw content was written by subject experts for lecture video. After that, the instructional designer created a scenario based on that raw content. Each scene was designed carefully by the instructional designer. Tables, illustrations, photographs, off-voice narrations, dialogs were defined in separate excel files. Learning activities of “*Dinle ve görseli seç*” (*Listen and choose the image*), “*Görseli yaz*” (*Write the image*), “*Dinle ve seç*” (*Listen and choose*), “*Boşluğa yaz*” (*Fill*

in the blanks) were designed similarly based on that raw content. The differentiated content was also produced based on this raw content. Some examples of files used in the design and production process were shared in Figure 5.

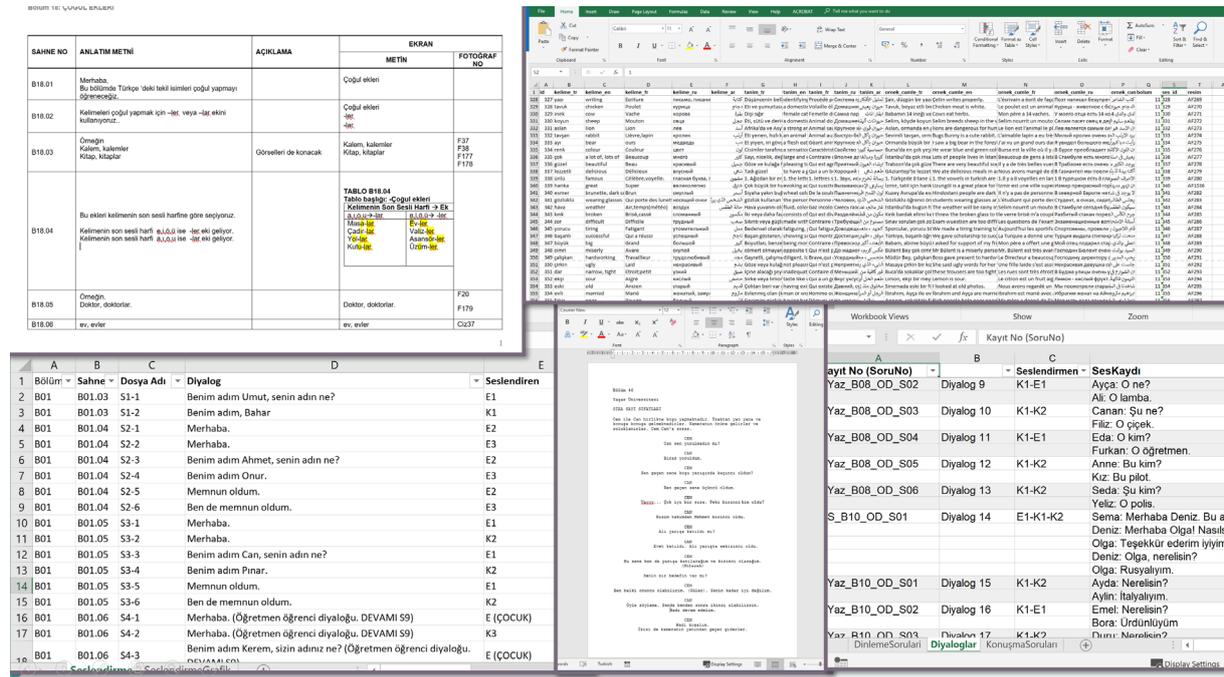


Figure 5: Some examples of excel file used in design and production process

Scenarios of drama videos are written by screenwriters, and they were controlled by the instructional designer and content experts. A book, which contains text of videos and vocabulary of the module, was also designed. Furthermore, a "User Guide" which includes short tutorials for learners about the use of the tools in the system was designed. In designing user guide, instructional designers defined the titles of the subjects and designed screens, screen texts and created video subtitles. A similar process has been done for the introduction video where basic information about the system is presented.

4.3. Designing the Assessment and Evaluation Processes

Self-assessment is tools should be provided in MOOC environments since it critical especially in MOOCs because of the absence of the role of the instructor and the requirement for high-autonomy. Learners in MOOCs are responsible for their own learning by arranging the time, pace and strategies. Therefore, self-assessment tests and feedback for each activity were placed in modules. The learner can take self-assessment tests multiple times, there is no time limitation in the test as well. Also, the *System Statistics* tool allow learners to track their learning process.

In this phase, questions and feedbacks were created by content experts for each module. After that, instructional designers edited the questions and eliminated the ones which were not compatible with LMS requirements.

4.4. Designing the Support Tools

Problems, which may encounter in the system and require support to learners, are determined as non-functioning /malfunctioning content such as broken link, "how-to" problems such as how to log in, a technical problem such as sound problems. Hence, the support content was dived into categories as shown in Figure 6.

Türkçe Öğreniyorum | Ana Sayfa | Türkçe Öğreniyorum

Türkçe Öğreniyorum > İLETİŞİM

Contact us about any problems or suggestions for improvement

This page allows you to report problems with, or suggest improvements to, Türkçe Öğreniyorum.

If you cannot find the answer in the [Help pages](#) then please choose the most relevant section below to get in touch with the appropriate people.

<p>Problem with content?</p> <ul style="list-style-type: none"> Site unavailable or permission denied? Missing file, broken link, or blank page? Problem with dates in calendar? Erroneous or misleading information? General query about the site? <p>Report the problem to the site owner</p>	<p>Ask for help?</p> <ul style="list-style-type: none"> Cannot log in? How can I do this? Cannot find the answer in the Help pages? <p>Report the problem to the Türkçe Öğreniyorum team</p>	<p>Report a technical problem?</p> <ul style="list-style-type: none"> Something has gone wrong? Problem with the system? Tool not working as it should? <p>Report the problem to the Türkçe Öğreniyorum team</p>	<p>Suggest improvement?</p> <ul style="list-style-type: none"> Voice a request for an improvement to one of the tools Suggest a brand new feature that would be useful to other users <p>Make a request for improvement</p>
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Figure 6: Support Tool

5. Development and Production Phase

In the production phase, the web page was developed, LMS was set up, video, analytics, and other services were integrated into LMS. After that, the content was developed and uploaded to the LMS platform. A customized web page created for registration of the user. The registration form was integrated to the web page. It collects demographic information of learners in four steps. At the final step, e-mail verification is used for approval of account information. This web page has multilanguage support.

Open source Sakai CLE was chosen as Learning Management System since it provides a wide variety of tools for activities and learner statistics. Kaltura MediaSpace was customized to serve as a repository for media collections. It is an open, flexible, and collaborative video platform and services for organizations. Kaltura offers the broadest set of video management and creation tools integrated with LMS. With a single video portal Kaltura MediaSpace, all our video/audio content is centralized and delivered in high quality to any device. We enriched our videos to make more engaging and discoverable experience by adding captions. It also provides localization configuration to adopt online content for regional specificity. Kaltura Built-In Analytics was used for user-level (which is the most viewed video or which videos were 100% play-through, which users watched the video and for how long/many times and their watching behaviors) and system reports (information per the OS, browser, or platform used). Kaltura and Google Analytics integration was made to track how users are engaging with content in different geographies and across different platforms (desktop, mobile etc.), operating systems and browsers.

Free web analytics tool Google Analytics offered by Google was used to track users and analyze their events in the learning environment. It provides a wide variety of information about the activity that takes place on LMS and MediaSpace of "Türkçe Öğreniyorum" Learning Environment. Google Analytics show data through metrics, which measure behavior, and dimensions. It helped us to describe who learners are and analyze their behaviors in the Learning Environment. In addition to analytics tool, MLSQ (Motivated Strategies for Learning Questionnaire) was integrated into the platform as a beginning module to measure the types of learning strategies and academic motivation used by learners.

Afterward, the production of the lecture and drama videos were conducted for 53 episodes in total. In the production of lecture videos, the following operations were carried out:

- Green screenshots
- Off-voice recordings for dialogues
- Photo shoots and procuring photos which could not be shot from stocks
- Drawing of illustrations or procuring them from stocks
- Designing of tables by the graphic designer in accordance with the screens
- Video editing
- Post-production.
- Uploading subtitles in Turkish, French, English, Arabic and Russian

Each section has drama videos that contain sample cases from everyday life. During the production of these videos, the following processes have been carried out:

- Venue selection
- Training of casts
- Making video shots
- Video editing
- Post-production.
- Uploading subtitles in Turkish



Figure 7: Behind the scenes images of video shootings.

Production of the lecture and drama videos were followed by the production of games, book, activities, dictionary, the dictionary of rules was conducted for 53 episodes in total. Photo shootings, illustrations, and sound recordings were performed in the same way for the activities (Dinle ve görseli seç, görseli yaz, dinle ve seç, boşluğa yaz), dictionary and dictionary of rules. Dictionary and dictionary of rules were translated into English, Arabic, Russian end, French. The books, which includes basic concepts, keywords, dialogues, and glossary in the videos, were prepared by the graphic designer. Next, User Guide and Introduction videos were prepared by screen recording method. Subtitles were also used for these videos. Finally, all the produced content was uploaded to the LMS, and usability tests were conducted.

6. Implementation phase

Following the design and development process, "Türkçe Öğreniyorum" MOOLC was launched and opened to the public use via <https://turkish.yasar.edu.tr/>. The official enouncement was made Yaşar University to universities, the ministry of education, the ministry of foreign affairs, embassies, social media was used for dissemination of the system as well.

7. Evaluation

In order to evaluate the system, user profile and learning behaviors are still being monitored by the means of Google Analytics, Analytics tool of Sakai LMS, MLSQ tool, registration form, and Analytics tool of Kaltura platform.

Conclusion

Learning in the 21st century is characterized by the tendency of time and space independence. The information and communication technologies play a central role in increasing the autonomy of individuals and facilitating fulfillment of learners' demands to take more of their differences and needs into consideration. The diversity of technologies and tools used for learning also makes it easier for individuals to address different learning needs and

preferences such as MOOCs. In this study, design, develop and implementation phases of "Türkçe Öğreniyorum" MOOLC was presented as an effort of know-how sharing. ADDIE was used as the instructional systems design model. In the analysis phase, our focus was on diagnosing a learning profile and the explore most common linguistic errors learners made to examine who struggles in which topics. In the design phase, the design of interfaces, content structure, lessons, assessment and evaluation processes, support and communication tools were performed. In the production phase, the web page was developed, LMS was set up, video, analytics, and other services were integrated into LMS. After that, the content was developed and uploaded to the LMS platform. In implementation phase "Türkçe Öğreniyorum" MOOLC was launched and opened to the public use. Learning analytics will be used in the evaluation phase.

References

- Bayraktar, N. (2005). Yabancılar Türkçe Öğretiminin Tarihsel Gelişimi. Retrieved from <http://www.turkceogretimi.com>.
- Büyükkikiz, K., & Hazırcı, S. (2013). Yabancı Dil Olarak Türkçenin Öğretiminde Sözcük Öğretimi Üzerine Bir Değerlendirme. *Mustafa Kemal Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 10(21), 145–155.
- Dabbagh, N., & Kitsantas, A. (2005). Using web-based pedagogical tools as scaffolds for self-regulated learning. *Instructional Science*, 33(5-6), 513-540.
- Ellis, R. (2005). *Instructed second language acquisition: A literature review*. Wellington, Australia: Research Division, Ministry of Education.
- Halliday, M. (1986). *An introduction to functional grammar*. London: Arnold.
- Hill, P. (2012). Four Barriers That MOOCs Must Overcome To Build a Sustainable Model. Retrieved from <http://mfeldstein.com/four-barriers-that-moocs-must-overcome-to-become-sustainable-model/>
- Hsu, Y. C., Ching, Y. H., Mathews, J. P., & Carr-Chellman, A. (2009). Undergraduate students' self-regulated learning experience in web-based learning environments. *Quarterly Review of Distance Education*, 10(2), 109-121.
- Hymes, D. (1971). *On communicative competence*. Philadelphia, PA: University of Pennsylvania Press.
- İBĞİGM: İçişleri Bakanlığı Göç İdaresi Genel Müdürlüğü. (2016). Migration Report. Retrieved from http://www.goc.gov.tr/files/files/2016_goc_raporu_.pdf
- Moore, M. G. (2007). The theory of transactional distance. In M. G. Moore (Ed), *Handbook of Distance Education* (pp. 89-105). Mahwah, NJ - Lawrence Erlbaum Associates.
- Morrison, G. R., Ross, S. M., Kemp, J. E., & Kalman, H. (2010). *Designing effective instruction*. John Wiley & Sons.
- Perifanou, M. A. (2014). PLEs & MOOCs in Language Learning Context: A challenging connection. In *Proceedings of the PLE Conference*. Retrieved from <http://pleconf.org/2014/files/2014/06/paper-34.pdf>
- Perifanou, M. (2016). Designing strategies for an efficient language MOOC. *CALL communities and culture-short papers from EUROCALL*, 380-385.
- Pintrich, P. R., & DeGroot, E. (1990). Quantitative and qualitative perspectives on student motivational beliefs and self-regulated learning. In *Annual Meeting of the American Educational Research Association, Boston, MA* (Vol. 128).
- The Council of Higher Education. (2018). Higher Education Statistics. Retrieved from <https://istatistik.yok.gov.tr/>
- Tomlinson, C. A. (2001). *How to differentiate instruction in mixed-ability classrooms* (2nd ed.). Alexandria, VA: ASCD.
- Yahşi Cevher, Ö., & Güngör, C. (2015). Yabancı Dil Olarak Türkçe Öğretiminde Akademik Türkçenin Öğrenimine İlişkin Uygulamalı Bir Araştırma: Türk Dili Öğretimi Uygulama ve Araştırma Merkezi Örneği. *International Journal of Languages' Education and Teaching*, 2267–2274.
- Yuan, L. & Powell, St. (2013). MOOCs and Open Education: Implications for Higher Education. A White paper, CETIS. Retrieved from <http://publications.cetis.ac.uk/2013/667>
- Yunus Emre Institute. (2016). YEE 2016 Faaliyet Raporu. Yunus Emre Enstitüsü. Retrieved from https://www.yee.org.tr/sites/default/files/yayin/2016_faaliyet_raporu_05.02.2018-db.pdf

Motivation And Rewards For Special Education Staff: A Focus Group Study On Greek Employees

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Abstract

The Aim Of This Study Was To Examine The Rewards For Special Education Staff And Its Importance For Their Motivation. For The Purpose Of This Study, A Focus Group Of Special Education Employees Was Set Up To Determine Their Perceptions, Feelings And Thoughts About Motivation And Rewards In The Work Environment. The Conceptual Research Framework Of Rewards Was Based On Total Rewards Model Of Towers Perrin, Which Embrace Everything That People Value In The Employment Relationship. Through The Focus Group, The Rewards That Were Provided In Their Work Environment And Were Important For Them And Their Motivation Were Identified, While Those Few That Were Not Included Were Determined. The Total Rewards Framework Proved To Be Appropriate And Useful In Understanding The Perspectives Of Special Education Staff On Rewards. The Findings Support The Notion That The Aspects Of Conceptual Research Framework That Concern The Work Environment Are The Rewards, Which Are The Most Important For Their Motivation, Followed By Those That Concern Benefits, Learning And Development. From The Focus Group We Draw Also Conclusions For The Factors That Affect Employee Motivation And The Rewards That Were Applied. The Significance Of Devotion To The Area Of Special Education And The Conscious Choice Of The Profession Were Highlighted By All The Participants. At The Same Time, The Focus Group Participants Completed The Motivation Work Scale (MAWS) Which Is Based On The Framework Of Self-Determination Theory (SDT). According To The Results, Intrinsic Motivation Has Scored High, Whereas External Motivation Proved To Be Less Important For The Participants. In National Level There Has Not Been Any Similar Study In The Field Of Special Education. The Usefulness Of The Results Lies In The Fact That The Holistic Study Of The Rewards Provided And Its Importance For Motivation Can Provide Feedback On Human Resource Management Decision Making Centers, Trade Union Representation, Employers And The Organization Of Curricula And Lifelong Learning. The Study Can, Also, Provide A Perspective For Future Research Through Total Reward Model Long-Term Exploitation.

Keywords: *Rewards, Motivation, Total Rewards, Special Education Staff, Motivation At Work Scale (MAWS), Greece*

Introduction

Employee Motivation Is One Of The Most Important Issues Of Management As It Is Linked To Human Behavior And Job Performance. Motivation Is Also One Of The Most Frequently Studied Subjects In Organizational Behavior. According To Baron (1991, P. 1) Motivation Is “An Internal Process That Activates, Guides And Maintains Behavior (Especially Goal- Directed Behavior)”. It Is Actually The Process That Explains The Intensity, The Direction And The Persistence Of An Individual's Effort Towards A Particular Goal (Robbins & Judge, 2007).

Furthermore, Rewards Have A Central Place In The Theoretical Models Of Human Resources Management (Storey, 1995). They Can Be Regarded As The Fundamental Expression Of The Employment Relationship (Armstrong, 2009). As Rewards Are Considered “The Benefits That Arise From Performing A Task, Rendering A Service Or Discharging A Responsibility” (Pitts, 1995, P. 13). The Reward System Of An Organization, As Henderson (2000, P. 17) Refers, “Includes Anything That An Employee May Value And Desire And That The Employer Is Able Or Willing To Offer In Exchange For Employer Contribution”. Rewards Are Commonly Categorized As Intrinsic And As Extrinsic (Deci, 1971).

Total Reward Is The Combination Of Financial And Non-Financial Rewards Available To Employees (Armstrong, 2009). It Emphasizes On All The Aspects Of Work Experience Value For Employees, And Not On Some Of Them Such As Pay And Benefits. It Aims To Mix The Financial And Non-Financial Elements Of The Reward Into A Single Set. This Approach Recognizes The Need For Financial Rewards But Also Emphasizes The Importance Of Providing Rewards Stemming From The Job They Are Doing, From The Work Environment, From How They Are Managed And The Opportunity To Develop Their Skills, And Their Careers (Armstrong & Cummins, 2011). As Defined By Manas And Graham (2003), Total Reward “Includes All Types Of Rewards – Indirect As Well As Direct, And Intrinsic As Well Extrinsic”. Each Aspect Of Reward, Namely Base Pay, Contingent Pay, Employee Benefits And Non-Financial Rewards, Which Include Intrinsic Rewards From The Work Itself, Are Linked Together And Treated As An Integrated And Coherent Whole. Total Rewards Combine The Impact Of The Two Major Categories Of Rewards: A) Transactional Rewards: Tangible Rewards Which Arise From Transactions Between The Employer And Employees Concerning Pay And Benefits, And B) Relational Rewards: Intangible Rewards Concerned With Learning And Development And The Work Environment (Armstrong, 2009). An Equally Wide Definition Of Total Rewards Is Offered By Prenzno And Griffith (2000) Who States That Total Rewards Are All The Available Tools That May Be Used To Attract, Retain, Motivate And Satisfy Employees. The Benefits Of Total Reward Approach Are:

- *Greater Impact:* The Combined Effect Of The Different Types Of Rewards Will Make A Deeper And Longer-Lasting Impact On The Motivation And Commitment Of People
- *Enhancing The Employment Relationship:* An Employment Relationship Based On Total Rewards Approach Makes The Maximum Use Of Relational As Well As Transactional Rewards And Will Appeal More To Individuals
- *Flexibility To Meet Individual Needs:* Through Total Rewards The Organization Can Better Meet The Special Individual Needs
- *Talent Management:* The Organization Can Become “An Employer’s Choice” And “A Great Place To Work” Thus Attracting And Retaining The Talented People It Needs (Armstrong, 2009).

Kerr (1997) Refers To The Following Features Of Ideal Rewards: A) Promote Both Efficiency And Equity, B) Meet Not Only Economic And Non-Economic Needs, C) Are Available, D) Everyone Has The Right To Participate In Them, E) Are Communicated To All Employees, F) Are Reversible. The Main Impact Of Satisfactory Rewards Is To Increase Incentives For Employees. Rewards And Incentives Play A Key Role In The Level Of Satisfaction That Employees Derive From Their Work. People Do Not Work Just For The Money. They Are Interested In An Organization That Has A Strong Vision, They Want Their Personal Development And To Give Value To The Organization. A Combination Of Basic Salary, Additional Benefits, Recognition Is Necessary For An Integrated Benefit Package (Zingheim & Schuster, 2000). A Compensation Plan Model For Direct Support Professionals Working With Individuals With Developmental Disabilities Integrates An Assortment Of Factors – Compensation, Benefits, Recognition And Incentives (Kuznia, 2008). Studies Have Also Shown That Teachers Appreciate Intrinsic Rewards, Such As Student Achievement And Positive Relationships With Them (Ashiedu & Scott-Ladd, 2012; Dilworth, 1991; Plihal, 1982; Taylor, Mcnaney-Funk, Jardine, Lehman, & Fok-Chan, 2014).

A Number Of Surveys Have Been Carried Out About The Positive Role Of Rewards On Motivation (Deci, 1971; Milne, 2007; Nyakundi, 2012). In Parallel, Many Studies Were Conducted Concerning Employee Preferences In Terms Of Rewards Provided By The Organizations They Work And How These Rewards Can Positively Affect Their Motivation. The Most Important And Most Desirable Rewards According To The Literature Are: Good Salary (Ali & Ahmed, 2009; Dilworth, 1991; Harpaz, 1990; Kim, 2005, 2005; Wiley, 1997), Job Security (Jurkiewicz, Massey, & Brown, 1998; Kim, 2005; Wiley, 1997), Career Development (Ali & Ahmed, 2009; Allen, Shore, & Griffith, 2003; Kim, 2005; Nyakundi, 2012), Autonomy And Initiative (Reeve & Deci, 1996; Richer & Vallerand, 1995; Zuckerman, Porac, Lathin, & Deci, 1978), Good Relationships With Colleagues (Gkorezis & Petridou, 2012; Harpaz, 1990; Kim, 2005), Good Relationship With Supervisor (Evans, 1970), Interesting And With Variety Work (Ali & Ahmed, 2009), Recognition And Reward (Ali & Ahmed, 2009; Gkorezis & Petridou, 2012; Wiley, 1997).

Although, Rewards As A Mean Of Enhancing Motivation Has Been Also The Subject Of Research And Annotation In Education (Ali & Ahmed, 2009; Ashiedu & Scott-Ladd, 2012; Dilworth, 1991; Nyakundi, 2012; Plihal, 1982; Taylor Et Al., 2014), Not Many Studies Were Found Regarding Special Education. Additionally, A Need For A More Holistic Approach, Such As The One “Total Reward” Approach Offers, Exists.

The Study

For The Purpose Of This Study, A Focus Group Of Special Education Employees Was Set Up To Determine Their Perceptions, Feelings And Thoughts About Motivation And Rewards In The Work Environment.

The Conceptual Research Framework (Figure 1), That Was Used For The Focus Group And Concerned Rewards For Special Education Staff, Was Based On Towers Perrin Model Of Total Reward (Armstrong & Brown, 2009, P. 25).

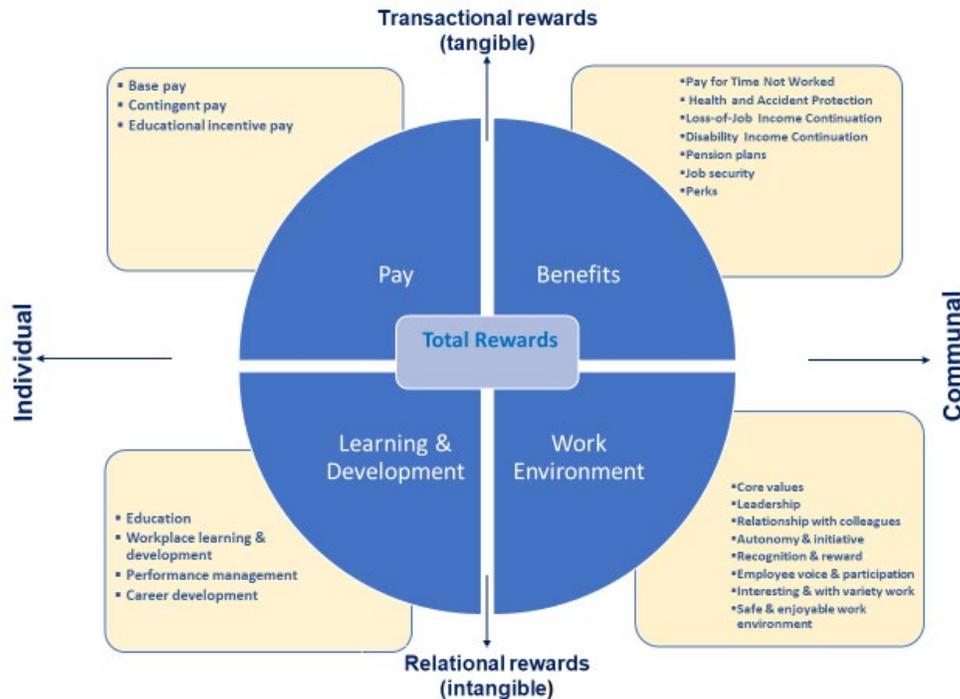


Figure 1: Conceptual Research Framework

The Conceptual Research Framework Embraced Everything That People Value In The Employment Relationship. The Upper Two Quadrants- Pay And Benefits- Represent Transactional Rewards. These Are Financial In Nature And Are Essential To Recruit And Retain Staff But Can Be Easily Copied By Competitors. By Contrast, The Relational (Non-Financial) Rewards At The Two Lower Quadrants Are Essential To Enhancing The Value Of The Upper Two Quadrants, Can't Be Easily Copied And Can Create An Advantage In Relation With The Human Capital And Its Management.

Aims

The Aims Of This Research Were To Determine The Views Of Special Education Employees On:

1. The Rewards That Applied
2. The Importance Of Rewards For Their Motivation

Focus Group

Since The Purpose Of This Research Was To Seek Insight Into The Perceptions, Feelings And Thoughts Of Special Education Staff The Data Required Was Essentially Qualitative. The Two Principal Means Of Collecting Qualitative Data In The Social Sciences Are Participant Observation, Which Typically Occurs In Groups, And Open-Ended Interviews, Which Typically Occur With Individuals (Morgan, 1997). Nevertheless, The Last Years Have Produced A Steady Increase In Social Scientists' Use Of Focus Groups, And There Is A Widespread Consensus That Focus Groups Are A Valuable Technique For Collecting Qualitative Data (Morgan, 1997). Focus Groups With Employees Have Been Helpful In Understanding The Perspectives Of Staff And Also In Identifying Or Testing Potential Policies Or Solutions Strategies (Krueger & Casey, 2000). Central To This Methodology Is To Gather Data On The Topic And Participants' Perceptions And Understanding (Kitzinger, 1994). Focus Groups Provide Also Access To Forms Of Data

That Are Not Obtained Easily With Individual Interviews Or Participant Observation (Morgan, 1997). The Intent Of The Focus Group Is To Promote Self-Disclosure Among The Participants. It Presents A More Natural Environment Than That Of An Individual Interview Because Participants Are Influencing And Influenced By Others- Just As They Are In Life (Krueger & Casey, 2000). The Comparative Advantage Of The Focus Group As An Interview Technique Lies In The Ability To Observe Interaction On A Topic And The Focus Group's Main Advantage In Comparison To Participant Observation Is The Opportunity To Observe A Large Amount Of Interaction On A Topic In A Limited Period Of Time (Morgan, 1997). The Focus Group Also Offers The Option To Not Respond, Which Is Not Available In Other Qualitative Methods. As Fern (1982) Mentions, A Concrete Demonstration Of The Strength That Focus Groups Offer Is That A Two Eight-Person Focus Groups Would Produce As Many Ideas As 10 Individual Interviews.

Participants

A Random Sampling Technique Was Used In The Recruitment Of The Participants. The Candidate Participants Were Special Education Employees With Experience In Public Primary And Secondary Education And Worked In Mainstream And Special Schools Of The Geographical Area Of Thessaloniki. Prior To The Focus Group, 15 Candidate Participants Were Individually Interviewed By Telephone With Regard To Some Demographics And Their Work Experience. Telephone Screening Interviews With Potential Participants Were Conducted A Month In Advance And A Very Short Questionnaire Was Used To See If The Candidate Participants Fit The Recruitment Strategy And If They Were Interested In Participating. The Telephone Screening Interviews And The Final Group Composition Of Participants Ensured That They Had Something To Say About The Research Topic And They Felt Comfortable Saying It To Each Other. The Focus Group Was Composed Of Eight People Who Did Not Know Each Other (Krueger & Casey, 2000; Morgan, 1997). Participants Were Similar To Each Other In A Way That Was Important To The Researchers And Served Focus Groups' Aims. The Focus Group Was Characterized By Homogeneity In The Sense That All Participants Were Public Sector Employees Who Work With Children With Special Needs. Besides, The Focus Group Was Characterized With Sufficient Variation Among Participants Concerning Mainly The Specialization, The Structures And The Work Experience, And The Employment Relationship. From The Seven Participants That Finally Took Part In The Focus Group, Six Were Females And One Was Male. There Were Three Participants That Belonged To The Age Group Of 41-50, Three That Belonged To The 30-40 Age Group And One That Was Under The 30 Years Old. All Of Them Had Special Education Studies, Whereas One Of Them Had Also A Two Years Reeducation In Special Education And Two Had Additionally A Master's Degree And A Phd. The Focus Group Consisted Of Four Special Education Teachers, Two Special Teaching Staff And One Kindergarten Teacher. With Regards To Teaching Experience, One Of The Participants Had Two Years In Special Education, For Five Of Them The Work Experience Varied Between 8 And 16 Years, While One Had 21 Years In Education, 8 Of Which Were In Special Education And 13 In General Education. With Respect To Their Current Position, Five Were In Primary Education, One Was In Secondary Education And One In Hospital School. Finally, Three Participants Had A Permanent Employment Relationship And Four A Temporary.

Instruments And Procedures

A Written Plan Was Developed And Included The Focus Group Purpose, A Background Information On Rewards And Motivation, The Conceptual Framework, A Plan Of Action, The Participants Information, The Research Team And A Questioning Route. A Brief Written Plan Was Send To The Participants Before The Focus Group Meeting And The Importance Of The Study And Their Participation Were Highlighted. Doing Something Like This Before Coming To The Focus Group Helps The Participants Prepare For The Group Discussion (Krueger & Casey, 2000). The Meeting Was Organized, Regarding The Day, The Time And The Location, So As To Be Convenient For The Participants And The Research Team. The Invitations Were Personalized, So As Each Participant To Feel That They Were Personally Needed And Wanted At The Interview And Their Participation Would Be Of Value In The Study. A Pilot Application Of The Questioning Route Preceded. An Introduction Opened The Meeting Which Included A Welcome, An Overview Of The Topic And The Ground Rules. The "Funnel" As A Compromise Approach Was Used, Which Is A Compromise Between Structured And Less Structured Approach (Morgan, 1997). The Focus Group Begun With A Less Structured Approach That Emphasized Free Discussion And Then Moved Toward A More Structured Discussion Of Specific Questions. The Questioning Route Was Arranged In Natural, Logical Sequence. More Specifically, Questions Moved From Broad And General To More Specific And Of Greater Importance To The Study And Were Categorized As Opening, Introductory, Transition, Key And Ending Questions. Clear, Simple, Easy To Say, And Open - Ended Questions Were Mainly Used For The Questioning Route. Questions That Engage Participants Were Also Used Such As Rating Items And Listing Things (Krueger & Casey, 2000), Whilst "Think-Back" Questions Were Preferred To Encourage Participants To Share Personal Experiences. The "Funnel"

Compromise Made It Possible To Hear The Participants' Own Perspectives In The Early Part Of The Discussion As Well As Their Responses To The Researcher Specific Interests In The Later Part Of The Discussion (Morgan, 1997).

The Focus Group Lasted About Two Hours As It Was Planned (Krueger & Casey, 2000). It Was Recorded In Three Ways: By A Tape Recorder, A Camera And With Written Notes. The Principal Mean Of Capturing Observations In A Focus Group Is Through Audio Taping (Morgan, 1997). Although Videotaping Is Very Little Recommended For Social Science Research (Krueger & Casey, 2000; Morgan, 1997), It Was Used To Ensure That Everything Was Recorded, To Determine Who Is Speaking And To Whom, And To Capture Facial And Nonverbal Details. During The Meeting, The Research Team's Involvement Was Moderate. The Goal Was To Create A Comfortable And Permissive Environment That Encouraged Participants To Share Perceptions And Points Of View And Interact With One Another, Without Pressuring Participants To Reach Consensus. The Interviewer Was Careful Not To Make Judgements About The Responses And To Control Body Language That Might Communicate Approval Or Disapproval. The Interviewer Also Tried To Give The Appearance Of Active Listening.

At The End Of The Focus Group, The Participants Were Asked To Complete The Motivation At Work Scale (MAWS). Particularly Were Asked To Indicate For Each Of The 12 Statements Of MAWS To What Degree They Presently Correspond To The Reasons They Are Doing This Specific Job, In A Scale From 1 (Not At All) To 7 (Exactly). The MAWS Was Developed With The Multidimensional Conceptualization Of Motivation Postulated In Self-Determination Theory (SDT). SDT Allows The Assessment Of Level And Type Of Motivation And Proposes Two Overarching Types Of Motivation: Intrinsic And Extrinsic. It Is A Dominant Theory Of Motivation In Social And Education Psychology Which Has Yielded Hundreds Of Empirical Publications Since The Early 80's (Gagné Et Al., 2010). Central To SDT Is The Distinction Between Autonomous Motivation And Controlled Motivation. Autonomous Motivation And Controlled Motivation Are Both Intentional And Together They Stand In Contrast To Amotivation, Which Involves A Lack Of Intention And Motivation (Gagné & Deci, 2005; Ryan & Deci, 2000). According To MAWS, Motivation Is Consistently Organized Into Four Types: Intrinsic Motivation, Identified Regulation, Introjected Regulation And External Regulation. As (Gagné Et Al., 2010) Mention:

Intrinsic Motivation Is Defined As Doing Something For Its Own Sake Because It Is Interesting And Enjoyable. *External Regulation* Refers To Doing An Activity To Obtain Rewards Or Avoid Punishments. *Introjected Regulation* Refers To The Regulation Of Behavior Through Self-Worth Contingencies Such As Ego-Involvement And Guilt. *Identified Regulation* Refers To Doing An Activity Because One Identifies With Its Value Or Meaning, And Accepts It As One's Own, Which Means That Is Autonomously Regulated. (P. 629)

Findings

The Meeting Of Focus Group Was Followed By The Video And Recording Transcription And The Data Analysis. Regarding Data Analysis, Two Stems Were Followed:

- *Qualitative Data Retrieval Of Focus Group*: It Included The Thematic / Topic Coding Of Data, The Indexing Of Qualitative Data Codes In Categories And The Cross Referral Of The Different Categories Of Qualitative Data
- *Focus Group Data Analysis*: It Included The Data Reduction, The Data Display And The Conclusions (Drawing And Verification) Which Took Place Before, During And After The Collection Of Qualitative Data (Miles & Huberman, 1994).

The Findings From The Focus Group With Special Education Staff Can Be Summarized Under Seven Major Headings Which Are:

- a. Motivation At Work
- b. The Importance Of Rewards At Work
- c. Rewards For Special Education Staff
- d. Rewards Not Included In The Conceptual Framework
- e. Important Rewards For Motivation
- f. Focus Group Clue
- g. Motivation At Work Scale (MAWS)

a. Motivation At Work

Motives For Profession Choice

Regarding Motivation At Work The First Question Had To Do With What Had Motivated Them To Choose The Specific Profession. In The Majority Of The Comments (6 Out Of 7 Participants), The Emphasis Was On The Conscious Choice Of Special Education, A Choice That They Did Not Regret, And Illustrated With Examples Such As The Following:

“Special Education Was A Very Romantic Choice. I Did Not Regret It”
“I Entered Special Education Which Always Had Some Appeal For Me...After 11 Years In General Education”
“It Was My First Choice...After A Visit To An Institution With People With Disabilities”
“I Entered Special Education Very Consciously. It Was My First Choice ...I Vividly Wanted It”
“My Big Love Was The Learning Difficulties, The Dyslexia ... So It Was A One-Way Street For Me, The Special Education And The Area Of Learning Difficulties”
“It Was Something I Really Liked. I Felt Like Contributing And I Could Change Things Through This Process”

A Participant Admitted That They Did Not Know The Area Of People With Disabilities, And Although This Was Chosen By Chance, It Was A Challenge And They Were Satisfied With This Choice.

Ease Or Difficulty To Motivate And Be Motivated: Factors That Affect It

As Far As Concerns The Ease Or Difficulty To Motivate And Be Motivated In Public Special Education, Although The Difficulty Was Emphasized, Some Ways To Succeed It Were Mentioned. These Had To Do With Passion, Good Mood, Core Values, Relationship With Colleagues And Recognition. The Following Examples Illuminate The Participants Point Of View:

“It Is Not So Easy To Motivate In Public Sector”

“It's Not Easy At All. But It Can Be Done ... And It's Done. Besides Me, It Needs Passion And Good Mood. In Public Schools You Don't Have All The Resources That You Need...There Are Many Shortcomings, Especially For Us Who Work As Integration Class Teachers And Each Year We Are In A Different School And Many Times We Should Prepare Everything From The Beginning”

“I Think Even Money Is Not An Incentive In Special Education. It's A Choice That Either You Want It Or Not. For Me A Motivation Was The Climate That Existed, It Was The Colleagues. I Was Fortunate To Work With Amazing People ... People Who Were Altruistic ...This Fulfills Me”

“In Public Sector Anyone That Does Not Want To Be Motivated, Can't Be Motivated In Any Way. Especially In Special Education, If You Didn't Choose It Because You Want It And You Chose It For Any Other Reason, You've Better Don't Go. If You Want, You Can Find Things That Motivate You”

“No Matter How Strange It Sounds...The Appreciation And Recognition That I Have Received From Parents And Children Was So Big”

“I Think There Is An Important Part... That You Can Actually Find Some People Around You To Work Together, Who Seem To Have Mood And Try...And Love It Anyway ... And They Are Motivated By Some Values. If There Was Collectivity, Which I Think Does Not Exist, This Would Have Made Me Work Better And With More Motivation. If There Were Collective Processes, Communication And Feedback...”

From The Focus Group We Draw Also Conclusions For The Factors That Affect Employee Motivation. These Factors Had Mainly To Do With Intrinsic Motivation And Work Environment. The Conscious Choice Of Special Education, The Passion And The Good Mood For The Job Itself, The Devotion To Special Education And The Personal Values Were The Incentives Mentioned That Intrinsically Motivate Them. The Significance Of Devotion To The Area Of Special Education And The Conscious Choice Of The Profession Were Highlighted By All The Participants. Factors That Had To Do With The Work Environment And Are Highlighted As Important For Their Motivation Were The Recognition From Parents And Children, The Relationship With Coworkers, The Organizational Climate, The

Collectivity, The Communication And The Feedback, And The Available Resources To Do Their Work In The Best Way.

b. The Importance Of Rewards At Work

Recognition Of Contribution -Rewards

With Regard To Their Feelings To Be Recognized And Rewarded For Their Contribution At Work, Participants Expressed Themselves Without Hesitation. Most Of The Participants Expressed Their Satisfaction For Their Work Recognition. Examples Are Given Below:

"I Think An Employee In Special Education Has So Many Reasons To Feel Lucky And That He/She Is Really Rewarded. So Even The Financial Rewards Count And The Fact That A Little Step That A Child Did, Will Raise You To The Heavens"

"I Believe That In Special Schools, Your Contribution Is Recognized. It Is Acknowledged But This Happens Slowly Because It's The Kind Of Work...That You Have To Do With A Specific Social Group Of Children. I Believe That The Greatest...The Most Important Reward, At Least For Me, Is The Slightest Student's Progress You See Because The Financial Rewards Do Not Exist. It Is Even When The Child Sits Down And Catches A Bottle To Pick It Up...This Can Change Your Whole Day. And Then You Say To Yourself: So, I Did Well That I've Chosen Special Education ...I Do Not Mind That There Are No Plasticines"

"I Want To Say That In Hospital Schools The Satisfaction Is Enormous. For The Financial Rewards Apply The Same As In Other Structures Of Special Education. But...In A Hospital School Satisfaction Is Immediate. Playing Even A Jigsaw Puzzle With A Child, The Smile, The Joy, That They Have Escaped From The Healing, That They Feel Like Being In A School Environment, That They Have Forgotten Their Illness. And, Also, The Joy Of The Parents Themselves"

Moreover, It Was Highlighted The Possibility For The Special Education Employees To Experience Some Difficult Situations And Problems (For Example Problems With Parents And Colleagues) That Can Disappoint Them And Make Them Feel That Their Contribution Is Not Recognized. An Example Follows:

"I Believe In Special Education You Feel Very Often...That You Are Not Rewarded. There Are Days That Something Went Wrong...Something With The Parents Mainly, Something With A Colleague, A Problem In The School...And Then You Say: It Is Not Worth It. We Feel That We Don't Get Back, That The Results Are Coming Very Slowly. When You Feel Rewarded ... You Do It Better"

c. Rewards For Special Education Staff

Through The Focus Group, The Rewards That Were Provided In Their Work Environment Were Identified.

Pay

With Respect To **Pay** Rewards, Apart From **Base Pay**, **Contingent Pay**, Which Is Connected With Required Qualifications, Years Of Work Experience, Studies And Children, Was Mentioned As A Reward Provided For Both Categories Of Employees, Permanent And Temporary. The Allowances Were Included In This Reward As Well. Respecting **Educational Incentive Pay**, This Is A Reward That Could Be Provided Only To Permanent Public Employees And Not To The Temporary. An Example Follows:

"There Is A Difference Between Permanent And Temporary Employees. There Is Not Any Educational Incentive Pay That Your Employer, Your Organization Pays For You...With Regards To Temporary Employees"

One Of The Participants Highlighted A Personal Experience:

"My Employee, Public Sector I Mean, Paid 2 Years For My Training, My Studies. And This Was Very Important For My Career Development. I Don't Know If I Could Have Done This By My Own"

Benefits

Among The Benefits Mentioned And Discussed During The Focus Group There Was The **Pay For Time Not Worked**. This Includes The Holidays, The Vacations, The Paternity/Maternity Leave, The Marriage Leave, The Regular Leave, The Personal Leave, The Funeral Leave, The Time Off To Vote, The Blood Donation, And The Sabbatical Leave, All Of Which Are Benefits Provided To All The Participants For Time Not Worked. With Reference To The Sick Leave And The Family Illness Leave, The Temporary Employees That Participated Agreed That There Is Not An Equal Treatment Between Them And The Permanent Staff And They Don't Actually Enjoy This Privilege. An Illustration Is Given Below:

"There's A Major Sticking Point For The Temporary Employees. If We Get Sick We'll Lose Half Of The Day Wage... And If We Take The Day As A Regular Leave We'll Lose A Whole Day Wage From The Unpaid Leave Allowance We Get In The End Of Each School Period...In The Summer. Which Means That We Can't Get Sick"

In Relation To The Lunch And Rest Periods, Most Participants Agree That They Have Some Free Time During A Work Day. A Representative Example Is The Following:

"The Break Is The Same For The Whole School, And If You Are Not On Duty, It Is Actually Your Free Time To Eat, To Go To The Restrooms Etc., Regardless That Anybody Can Ask For Your Help During The Break"

Somewhat In Contrast, It Was Strongly Mentioned That The Special Assistant Personnel Can't Actually Have A Break And Enjoy This Benefit. An Example Follows:

"The Special Assistant Personnel Can't Have A Break For Lunch And Rest As We Have To Be All The Time With The Child We Assist...Also During Its Break For Food. You Can't Even Go To The Restrooms...Unless You Have A Good Colleague- Teacher Who Wants To Help You And Take Care Of The Child For 5 Minutes"

Other Benefits That Are Provided Are The Following:

Health And Accident Protection: It Includes Medical, Hospital And Surgical Insurance-For Self And Dependents-Resulting From An Accident Or Illness, Prescription Drugs, Daily Maternity Allowance, One-Off Childbirth Allowance, Etc.

Loss-Of-Job Continuation: It Includes Unemployment Insurance, Severance Pay, Etc.

Disability Income Continuation: It Includes Short-Term Disability, Sickness And Accident (S & A), Long-Term Disability (LTD), Etc.

Perks: They Include I) **Flexible Perks** Such As Unpaid Leave, Half-Day Occupation, Ii) **Other Perks** Such As Parking, Transportation To And From Work-Commuting Assistance, Free Entrance To Museums And Archaeological Places, Tickets To Entertainment Events

Among The Benefits Recognized By All The Participants Were Also The **Pension Programs. Job Security**, As A Benefit, Mentioned, As It Was Expected, Only By The Permanent Employees.

Learning & Development

Regarding **Education**, Most Of The Permanent Employees Recognized The Training Opportunities They Have To Acquire New Knowledge And Develop Skills, Whereas The Employee Of The Hospital School Highlighted That No Education Is Provided Regarding Hospital Schools:

"There Is No Education For Hospital Schools"

Among The Participants With Temporary Employment Relationship There Was A General Agreement That Not Enough Training Opportunities Exist For Them And In Some Cases This Only Happens After The Employees' Personal Initiative. The Development Of Work And Personal Skills And Knowledge With The Help Of The Boss And Colleagues (**Workplace Learning & Development**) Was Acknowledged By All The Participants As A Reward. With Reference To The **Performance Management** Some Participants Emphasized The Need For Specific Performance Goals And Expected Results, And Others The Significant Factor Of Constructive Feedback. It Is Worth Noting That In Many Cases The Available Resources (Time, Knowledge, Skills, Human Resources, Physical And Technical Means) Are Not Enough For The Best Performance Management. In Relation To **Career Development**, It Was Acknowledged That There Are Career Prospects And Opportunities For Career Development In Public Special Education But These Are For Few Available Positions And Not For The Temporary Staff.

Work Environment

What The Findings Suggest Is That The Rewards Which Are Related To The Work Environment Vary According To The School, Where The Special Education Staff Will Be Assigned To Each Year. There Was A Consensus Among Participants That There Is A Differentiation From School To School, From Year To Year. Among The Rewards Mentioned In Relation With The Work Environment Were The Following:

Core Values: They Include The Employment In An Organization With A Distinct And Good Profile And The Identification With The Organization's Values

Leadership: It Includes A Supportive And A Flexible Leadership That Inspires Trust And Faith To Others With The Power And Enthusiasm Of A Vision, A Leadership That Gives A Sense Of Purpose And Pride, A Leadership That Manages Through Goals And Offers Constructive Feedback On The Results Of The Work. Some Examples Are Given Below:

“The Director Plays A Very Important Role...The Director Should Also Be A Leader. It Is So Difficult For Someone To Be A Good Director And Inspire The Whole Staff”

“The Person Always Plays A Role. There Are Directors Who Have No Ears To Hear, There Are Others Who Have”

Relationship With Colleagues: It Includes A Good Cooperation With Colleagues, A Constructive Social Relationship With Colleagues, An Environment Where Trust, Friendship, Teamwork, Loyalty Exist With Respect To An Environment Where Trust, Friendship, Teamwork, Loyalty Exist, The Majority Of The Participants Referred That It Can't Be Found Totally. One Of Them Distinctively Mentioned:

“It Does Not Exist In All Levels. I Believe That This Could Have Been A Very Important Incentive”

Autonomy And Initiative: It Includes The Flexible Work Scheduling, The Freedom Of Movement In The Workplace, The Adequate Control Of The Job, The Sense Of Responsibility Of Work Results

Recognition And Reward: It Includes The Recognition And The Reward Of The Employee As A Useful And Valuable Contributor, The Recognition Of Good Performance And Offer

Employee Voice And Participation: It Includes The Provision Of Opportunities For Participation In Decision-Making Processes, The Employee Voice On How To Perform The Work

Two Significant Factors Mentioned That May Affect The Employees' Voice In The Organization. These Were The Work Experience And The Employment Relationship (Temporary And Permanent). An Example Can Be Found In The Following Statement Of A Participant With Temporary Employment Relationship:

“I Want To Emphasize Something That I Feel Very Strongly. When You Are One Year In This School And One Year In Another You Can't Have Voice. Now That I Am 5 Years In The Current School, I've Started To Speak And To Be Heard. In The First Year I Did Not Speak For Myself, In The Second Year I Was Speaking Just A Little Bit More ...In 5 Years I Can Speak And I Feel Confident. But They Do Not Easily Give Voice To A Temporary Employee”

Interesting And With Variety Work: It Includes An Interesting And Important Work, A Work With Variety And Many Challenges, A Work That Requires Sufficient Attention And Effort, A Meaningful Work

Safe And Enjoyable Work Environment: It Includes A Safe And A Pleasant Work Environment That Minimizes Work-Related Stress And Pressure. A Good Example Is Given Below:

“I'm In A Kindergarten And It's Really Very Pleasant. I Have A Lot Of Fun”

Somewhat In Contrast, The Employee Of The Hospital School Questioned The Existence Of An Enjoyable Work Environment As A Reward:

“The Hospital Environment Is Not Pleasant, Not At All Pleasant, It Is Arduous”

d. Rewards Not Included In The Conceptual Framework

Through The Focus Group, Two Rewards That Were Not Included In The Conceptual Framework Were Determined. Both Of Them Were Related To The Work Environment And Are Described Below.

Psychological And Emotional Rewards: These Are Rewards With Respect To The Relationship With Children And Parents And Include The Contact With The Child (For Example A Smile, A Hug), The Child Development, The Moral Satisfaction For The Provided Help To Children And Parents

Collectivity: It Includes Frequent And Diffused Collective Processes Of Pedagogical Practices And Pedagogical Policy
The Importance Of These Rewards Was Highlighted By The Majority Of The Participants.

e. Important Rewards For Motivation

Through The Focus Group, The Rewards That Were Important For Them And Their Motivation Were Identified. The Findings Support The Notion That The Aspects Of Conceptual Research Framework That Concern The Work Environment Are The Rewards Which Are The Most Important For Their Motivation, Followed By Those That Concern Learning And Development And Benefits (Table 1).

Table 1: Rewards In Order Of Priority

Total Reward Aspects	Rewards In Order Of Priority	Illustrations
Work Environment	Psychological And Emotional Rewards	<i>“Relationship With Children And Parents”</i> (4 Participants) <i>“Child Development”</i> (4 Participants) <i>“Moral Satisfaction”</i> (4 Participants) <i>“A Smile, A Hug”</i> (3 Participants)
	Safe And Enjoyable Work Environment	<i>“Pleasant Work Environment”</i> (1 Participant) <i>“Enjoyable Environment-Pleasant”</i> (1 Participant)
	Relationship With Colleagues	<i>“Collaboration With Active And Hearty Colleagues”</i> (2 Participants)
	Collectivity	<i>“Frequent And Diffused Collective Processes Of Pedagogical Practices And Pedagogical Policy”</i> (1 Participant)
	Recognition And Reward	<i>“Employee’s Work Recognition”</i> (1 Participant)
Learning & Development	Performance Management	<i>“Available Resources”</i> (2 Participants)
	Education	<i>“Educational Opportunities”</i> (1 Participant)
	Workplace Learning And Development	<i>“Workplace Learning And Development: Training Policies For Hospital Schools”</i> (1 Participant)
Benefits	Job Security	<i>“Stable Work Environment”</i> (2 Participants) <i>“Permanent Employment Relationship”</i> (1 Participant) <i>“Job Security”</i> (1 Participant)
	Pay For Time Not Worked	<i>“Work Benefits (Pay For Time Not Worked, For Example Sick Leave)”</i> (1 Participant)
Pay	Base Pay	<i>“Salary”</i> (1 Participant)

	Contingent Pay	“Maybe An Allowance For The Summer, When We Do Not Work” (1 Participant)
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Regarding Work Environment The Most Important Rewards For Participants Motivation Had To Do With The Psychological And Emotional Rewards, The Safe And Enjoyable Work Environment, The Relationship With Colleagues, The Collectivity, The Recognition And Reward. With Respect To Learning And Development The Most Important Rewards For Their Motivation Were Related To The Performance Management, The Education And The Workplace Learning And Development. As Far As Concerns The Benefits, They Had To Do With The Job Security And The Perks. The Less Important Rewards Were Those Connected To Pay, Such As The Base Pay And The Contingent Pay.

f. Focus Group Clues

The Focus Group Finished By Asking Each Participant To Reflect On What They Considered To Be The Most Important Issue That Had Emerged From The Discussion. These Clues Can Be Summarized, According To The Frequency That Were Mentioned By The Participants, As Follows: The Very Positive Experience Of Participating In The Focus Group, The Passion, The Devotion And The Conscious Choice Of Special Education, The Difficulties Of Working In Special Education, The Consistency Of Views And Values For Special Education Staff.

g. Motivation At Work Scale (MAWS)

The Descriptive Statistics (Minimum, Maximum, Mean And Standard Deviation) For Each Subscale Of MAWS Can Be Found In Table 2. According To The Results, Intrinsic Motivation And Identified Regulation Have Scored High, Whereas Introjected And External Regulation Proved To Be Less Important For The Participants, Regarding The Reasons They Are Doing The Specific Job. Specifically, Intrinsic Motivation Of The Participants Proved To Be Almost Very Strong (Mean 5.9), The Identified Regulation Was Between Strong And Very Strong (Mean 5.3), Whereas Identified And External Regulation Were Found To Be Between Low And Moderate (Mean 3.42 And 3.47 Respectively). Regarding The Total Descriptive Statistics Of The 12 Statements Of MAWS For All The Participants, The Mean Was 4.55 (Between Moderate And Strong), With Minimum And Maximum 3.5 And 5.25 Respectively, While The Standard Deviation Was .60.

Table 2: Descriptive Statistics For Each Subscale Of MAWS

	N	Minimum	Maximum	Mean	Std. Deviation
Intrinsic Motivation	7	5.33	6.67	5.9048	.49868
Identified Regulation	7	3.67	6.33	5.3810	.84828
Introjected Regulation	7	2.00	5.00	3.4286	1.18187
External Regulation	7	2.33	4.00	3.4762	.71640

Below Are Presented The Participants Answers In The Four Subscales Of MAWS: Intrinsic Motivation, Identified Regulation, Introjected Regulation And External Regulation. The Answers To The 12 Statements (3 For Each Subscale) Ranged From 1 (Not At All) To 7 (Exactly) Concerning The Degree That The Statements Presently Correspond To The Reasons They Are Doing This Specific Job.

Intrinsic Motivation

The First Three Statements Of The MAWS Concerned Intrinsic Motivation:

Intrinsic 1 Because I Enjoy This Work Very Much

Intrinsic 2 Because I Have Fun Doing My Job

Intrinsic 3 For The Moments Of Pleasure That This Job Brings Me

The Answers Varied From Strongly (5) To Exactly (7). The Majority Of The Participants Chose Very Strongly (5) For These Statements, Followed By Strong (5) And Exactly (7). The First Statement (*Intrinsic 1*) Has Scored Higher (Mean 6.28) Than The Other 2 Statements Of The Subscale.

Identified Regulation

The Statements From 4 To 6 Concerned Identified Regulation:

Identified 1 I Choose This Job Because It Allows Me To Reach My Life Goals

Identified 2 Because This Job Fulfills My Career Plans

Identified 3 Because This Job Fits My Personal Values

The Answers In This Subscale Varied From Very Little (2) To Exactly (7). The Majority Of The Participants Answered Very Strongly (6), Followed By Strongly (5). The Participant That Answered Very Little (2) And Little (3) In The Statements 4 (*Identified 1*) And 5 (*Identified 2*) Respectively, Belonged To The Special Teaching Staff Who, According The Results, Does Not Have Many Opportunities For Education And Development. The Sixth Statement (*Identified 3*) Has Scored Higher (Mean 6.14) Than The Other 2 Statements Of The Subscale.

Introjected Regulation

The Statements From 7 To 9 Concerned Introjected Regulation:

Introjected 1 Because I Have To Be The Best In My Job, I Have To Be A "Winner"

Introjected 2 Because My Work Is My Life And I Don't Want To Fail

Introjected 3 Because My Reputation Depends On It

In This Subscale A Greater Dispersion Is Found In The Degree That The Statements Presently Correspond To The Reasons They Are Doing This Specific Job. The Answers Varied From Not At All (1) To Very Strongly (6), Whereas No Exactly (7) Answer Was Given. The Majority Of The Participants Answered Moderately (4) In The Statements Of This Subscale. The Eighth Statement (*Introjected 2*) Has Scored Higher (Mean 4) Than The Other 2 Statements Of The Subscale.

External Regulation

The Statements From 10 To 12 Concerned External Regulation:

External 1 Because This Job Affords Me A Certain Standard Of Living

External 2 Because It Allows Me To Make A Lot Of Money

External 3 I Do This Job For The Paycheck

In This Subscale Likewise, A Great Dispersion Is Found In The Degree That The Statements Presently Correspond To The Reasons They Are Doing This Specific Job. The Answers Varied From Not At All (1) To Strongly (5), Whereas No Very Strongly (6) And No Exactly (7) Answer Were Given. The Majority Of The Participants Answered Moderately (4) In The Statements Of This Subscale. The Tenth Statement (*External 1*) Has Scored Higher (Mean 4.43) Than The Other 2 Statements Of The Subscale.

MAWS Results Correlation With Focus Group Results

According To The Participants Statements It Is Not Very Easy To Be Motivated In Public Special Education, Which Is Strengthened By An Almost Moderate Mean (4,55) In MAWS Total Results For Their Motivation. Participants Are Mainly Intrinsically Motivated By Their Passion, Their Good Mood And Their Devotion To Special Education And The Choice Of The Profession Came Consciously. According To The MAWS Results, Intrinsic Motivation, Which Has To Do With A Likeable And Entertaining Job With Moments Of Joy, Was Strong For All The Participants (Mean: 5,9). Financial Incentives Were Not Included To The Factors That Can Affect Their Motivation, Something That Is

Confirmed By The Low Mean Score (3,47) In The Subscale Of External Regulation Which Had To Do With Money And Standard Of Living.

Comparing What Motivated Them To Choose The Specific Profession And What Now Motivates Them To Do The Job They Are Doing Significant, Similarities Can Also Be Found. These Similarities Can Be Identified Between The Participants' Answers About The Motives Of Profession Choice (The Passion, The Good Mood And The Devotion To Special Education) And Their Answers For The Intrinsic Motivation Subscale. Besides, Alike ness Can Be Identified Between Their Answers For The Identified Regulation Subscale And Other Motives Mentioned Such As The Conscious Choice Of The Profession, The Career Plans And The Personal Values. This Is Reinforced By The Fact That For All The Participants The Subscales Of Intrinsic Motivation And Identified Regulation Have Scored High. The Latter Can Be Also Compared To The Motives For Profession Choice.

From The Comparison Of MAWS Results With The Important Rewards For Motivation, It Can Be Inferred That The Most Important Rewards For Their Motivation Had Mainly To Do With Their Intrinsic Motivation And Secondly With Identified Regulation. It Is Worth Noting That The Few Rewards That Were Related With External Regulation (Pay) Were Mentioned By The Participants With Temporary Employment Relationship.

Conclusions

This Research Offers An Important Window On The Special Education Staff' Perspectives On Rewards And Motivation At Work Environment. In National Level There Has Not Been Any Similar Study In The Field Of Special Education. The Total Rewards Framework Proved To Be Appropriate And Useful In Understanding The Perspectives Of Special Education Staff On Rewards. Nevertheless, It Is Proposed That A Revised Version Of The Conceptual Framework, That Would Include The Two Rewards That Emerged From The Focus Group Meeting (Psychological And Emotional Rewards, And Collectivity), Should Be Used In Future Studies For Special Education Staff Rewards. Furthermore, The Findings Of This Study Advanced Our Knowledge Of Rewards Provided And Highlighted The Rewards That Can Mainly Affect Their Motivation. In Line With The Results, The Relational Rewards That Concerned Work Environment And Learning And Development Were The Most Important For The Motivation For Both Permanent And Temporary Special Education Employees. The School Environment And The Working Conditions Were Also Very Important Rewards For Other Teachers Of Public Sector In Australia (Ashiedu & Scott-Ladd, 2012). A Dynamic Work Environment That Fosters Creativity Was Highly Valued As An Important Reward In Another Study (Taylor Et Al., 2014). Moreover, The Reward System And The Training Highly Affect Teachers' Motivation In Public Secondary Schools, While The School Environment Should Be Conducive For Them To Ensure Their Motivation, By Providing Them With Adequate Teaching And Learning Resources (Nyakundi, 2012).

Without Exception, All The Participants Were Primary Intrinsically Motivated, And Psychological And Emotional Rewards, Such As Their Relationship With Children And Parents, The Child Development And The Moral Satisfaction For The Help They Provide To Children And Parents, Seem To Be For The Majority Of Them Of Great Importance. Findings Of Two Previous Studies Indicated That Intrinsic Rewards Were Key Factors In Contributing To Teacher Retention And Longevity Within The Profession (Ashiedu & Scott-Ladd, 2012; Taylor Et Al., 2014). In One Of The Previous Mentioned Studies (Ashiedu & Scott-Ladd, 2012) Most Public Sector Teachers, That Participated, Cited Intrinsic Motivators As The Reasons For Joining The Teaching Profession. Moreover, According To Plihal (1982), The Enjoyment Of Elementary School Teachers' Interaction With Students And The Feeling Of Being Instrumental In Students Accomplishments Were The Two Major Types Of Intrinsic Rewards. Intrinsic Rewards, Such As The Fulfillment Of Having Successfully Contributed To Child's Development, Were Also More Important Than The Extrinsic Rewards In Another Study For Teachers (Dilworth, 1991). Additionally, As Stated By Taylor Et Al. (2014) Teachers Had An Innate Desire To Help Children In Their Overall Development And Impact Their Lives In A Positive Way, And They Valued Building Relationships And Making A Difference In The Lives Of Their Students As The Main Rewards Of Teaching.

Financial Incentives Were Not Included To The Factors That Could Affect Their Motivation And Were Not Among The Most Important Rewards For Their Motivation, Whereas A Low Mean Score Was Found In The Subscale Of External Regulation In MAWS, Which Had To Do With Money And Standard Of Living. As Reported By Pinto (2011) There Is No Direct Connection Between Pay And Motivation And As Stated By Dilworth (1991) Teachers Don't Take So Much Satisfaction From The Extrinsic Rewards Such As Compensation And Position.

Finally, The Results Shed Light On The Rewards That The Temporary Staff Can't Actually Enjoy. These Were Not Only Relational Rewards Such As Education, Workplace Learning And Development, And Employee Voice And Participation, But Transactional As Well, Such As Benefits (Sick Leave) And Job Security. Job Security Was The One That Can Be Logically Justified Given The Permanent Nature Of Their Employment Relationship.

The Usefulness Of The Results Lies In The Fact That The Holistic Study Of The Rewards Provided And Their Importance For Motivation Can Give Feedback On Human Resource Management Decision Making Centers, Trade Union Representation, Employers And The Organization Of Curricula And Lifelong Learning. The Study Can, Also, Provide A Perspective For Future Research Through Total Reward Model Long-Term Exploitation.

The Focus Group Composition Proved To Be Satisfactory To Capture The Perceptions, Feelings And Thoughts Of Special Education Staff About Motivation And Rewards In The Work Environment And Satisfied The Study Aims. The Constraint On The Variety Of Specialties Participation Of Special Teaching Staff Could Be Considered As A Limitation Of This Study.

References

- Ali, R., & Ahmed, M. S. (2009). The Impact Of Reward And Recognition Programs On Employee's Motivation And Satisfaction: An Empirical Study. *International Review Of Business Research Papers*, 5(4), 270–279.
- Allen, D. G., Shore, L. M., & Griffeth, R. W. (2003). The Role Of Perceived Organizational Support And Supportive Human Resource Practices In The Turnover Process. *Journal Of Management*, 29(1), 99–118.
- Armstrong, M. (2009). *Armstrong's Handbook Of Human Resource Management Practice* (11th Ed). London: Kogan Page.
- Armstrong, M., & Brown, D. (2009). *Strategic Reward: Implementing More Effective Reward Management*. London: Kogan Page.
- Armstrong, M., & Cummins, A. (2011). *The Reward Management Toolkit: A Step-By-Step Guide To Designing And Delivering Pay And Benefits*. London: Kogan Page.
- Ashiedu, J. A., & Scott-Ladd, B. D. (2012). Understanding Teacher Attraction And Retention Drivers: Addressing Teacher Shortages. *Australian Journal Of Teacher Education (Online)*, 37(11), 23.
- Baron, R. A. (1991). Motivation In Work Settings: Reflections On The Core Of Organizational Research. *Motivation And Emotion*, 15(1), 1–8. <https://doi.org/10.1007/BF00991472>
- Deci, E. L. (1971). Effects Of Externally Mediated Rewards On Intrinsic Motivation. *Journal Of Personality And Social Psychology*, 18(1), 105–115.
- Dilworth, M. E. (1991). *Motivation, Rewards, And Incentives. Trends And Issues Paper No. 3*. ERIC Clearinghouse On Teacher Education, Washington, DC. Retrieved From <https://eric.ed.gov/?id=ED330692>
- Evans, M. G. (1970). The Effects Of Supervisory Behavior On The Path-Goal Relationship. *Organizational Behavior And Human Performance*, 5(3), 277–298. [https://doi.org/10.1016/0030-5073\(70\)90021-8](https://doi.org/10.1016/0030-5073(70)90021-8)
- Fern, E. F. (1982). The Use Of Focus Groups For Idea Generation: The Effects Of Group Size, Acquaintanceship, And Moderator On Response Quantity And Quality. *Journal Of Marketing Research*, 19(1), 1–13. <https://doi.org/10.2307/3151525>
- Gagné, M., & Deci, E. L. (2005). Self-Determination Theory And Work Motivation. *Journal Of Organizational Behavior*, 26(4), 331–362. <https://doi.org/10.1002/job.322>
- Gagné, M., Forest, J., Gilbert, M.-H., Aubé, C., Morin, E., & Malorni, A. (2010). The Motivation At Work Scale: Validation Evidence In Two Languages. *Educational And Psychological Measurement*, 70(4), 628–646. <https://doi.org/10.1177/0013164409355698>

- Gkorezis, P., & Petridou, E. (2012). The Effect Of Extrinsic Rewards On Public And Private Sector Employees' Psychological Empowerment: A Comparative Approach. *The International Journal Of Human Resource Management*, 23(17), 3596–3612. <https://doi.org/10.1080/09585192.2011.639025>
- Harpaz, I. (1990). The Importance Of Work Goals: An International Perspective. *Journal Of International Business Studies*, 21(1), 75–93.
- Henderson, R. I. (2000). *Compensation Management In A Knowledge-Based World* (8th Ed). Upper Saddle River, NJ: Prentice Hall.
- Jurkiewicz, C. L., Massey, T. K., & Brown, R. G. (1998). Motivation In Public And Private Organizations: A Comparative Study. *Public Productivity & Management Review*, 21(3), 230–250. <https://doi.org/10.2307/3380856>
- Kim, S. (2005). Gender Differences In The Job Satisfaction Of Public Employees: A Study Of Seoul Metropolitan Government, Korea. *Sex Roles*, 52(9–10), 667–681. <https://doi.org/10.1007/S11199-005-3734-6>
- Kitzinger, J. (1994). The Methodology Of Focus Groups: The Importance Of Interaction Between Research Participants. *Sociology Of Health & Illness*, 16(1), 103–121. <https://doi.org/10.1111/1467-9566.Ep11347023>
- Krueger, R. A., & Casey, M. A. (2000). *Focus Groups: A Practical Guide For Applied Research* (3rd Ed). Thousand Oaks, Calif: Sage Publications.
- Kuznia, A. (2008). *Designing A Variable Compensation Plan For Direct Support Professionals In The Field Of Developmental Disabilities* (Phd Thesis). The College Of St. Scholastica.
- Manas, T. M., & Graham, M. D. (2003). *Creating A Total Rewards Strategy A Toolkit For Designing Business-Based Plans*. New York: American Management Association.
- Miles, M. B., & Huberman, A. M. (1994). *Qualitative Data Analysis*. Thousand Oaks: Sage.
- Milne, P. (2007). Motivation, Incentives And Organisational Culture. *Journal Of Knowledge Management*, 11(6), 28–38. <https://doi.org/10.1108/13673270710832145>
- Morgan, D. L. (1997). *Focus Groups As Qualitative Research*. Thousand Oaks, Calif.: Sage Publ.
- Nyakundi, T. K. (2012). *Factors Affecting Teacher Motivation In Public Secondary Schools. In Thika West District, Kiambu County* (Phd Thesis).
- Pinto, E. P. (2011). The Influence Of Wage On Motivation And Satisfaction. *The International Business & Economics Research Journal; Littleton*, 10(9), 81–91.
- Pitts, C. (1995). *Motivating Your Organization: Achieving Business Success Through Reward And Recognition*. London; New York: Mcgraw-Hill Book Co.
- Plihal, J. (1982). Types Of Intrinsic Rewards Of Teaching And Their Relation To Teacher Characteristics And Variables In The Work Setting. Presented At The Annual Meeting Of The American Educational Research Association, New York.
- Prenzno, N., & Griffith, D. (2000). *Total Rewards: From Strategy To Implementation*. Scottsdale, AZ: Worldatwork.
- Reeve, J., & Deci, E. L. (1996). Elements Of The Competitive Situation That Affect Intrinsic Motivation. *Personality And Social Psychology Bulletin*, 22(1), 24–33.
- Richer, S. F., & Vallerand, R. J. (1995). Supervisors' Interactional Styles And Subordinates' Intrinsic And Extrinsic Motivation. *The Journal Of Social Psychology*, 135(6), 707–722.
- Robbins, S. P., & Judge, T. (2007). *Organizational Behavior* (12th Ed). Upper Saddle River, N.J: Pearson/Prentice Hall.

Ryan, R. M., & Deci, E. L. (2000). Self-Determination Theory And The Facilitation Of Intrinsic Motivation, Social Development, And Well-Being. *American Psychologist*, 55(1), 68–78. <https://doi.org/10.1037/0003-066X.55.1.68>

Storey, J. (Ed.). (1995). *Human Resource Management: A Critical Text*. London: Routledge.

Taylor, C., Mcnaney-Funk, C., Jardine, D., Lehman, G., & Fok-Chan, E. (2014). *Teacher Rewards: Going Beyond The Stickers--Moving Beyond Extrinsic Motivation*. Retrieved From <https://eric.ed.gov/?id=ED546455>

Wiley, C. (1997). What Motivates Employees According To Over 40 Years Of Motivation Surveys. *International Journal Of Manpower*, 18(3), 263–280. <https://doi.org/10.1108/01437729710169373>

Zingheim, P. K., & Schuster, J. R. (2000). Total Rewards For New And Old Economy Companies. *Compensation & Benefits Review*, 32(6), 20–23. <https://doi.org/10.1177/08863680022098091>

Zuckerman, M., Porac, J., Lathin, D., & Deci, E. L. (1978). On The Importance Of Self-Determination For Intrinsically-Motivated Behavior. *Personality And Social Psychology Bulletin*, 4(3), 443–446.

Motivational Self-Talk And Mental Toughness Relationship In Athletes: Mediator Role Of Friend Support

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Abstract

The purpose of this study is to examine the mediating role of friend support in relation to motivational self-talk and mental toughness in athletes. The study group consisted of a total of 200 athletes (age mean: 21,08 + 1,44), 113 women (Age mean: 20,47 + 1,61) and 87 men (Age mean: 21,86 + 3,96). The subscales of friendship support, mental toughness scale, subscale of multidimensional social support scale and self-talk Scale's motivational self-talk subscale were used for the collection of research data. Pearson correlation analysis was used first to determine the relationships between the variables, PROCESS macro regression analysis was used to determine the influence of friend support between motivational self-talk and mental toughness in the analysis process of the data. Analyses were performed at 95% confidence interval and the Sobel z test was used to test whether the mediation was meaningful. SPSS 22.00 package program was used for the analysis of the research. According to research findings, motivational self-talk levels of athletes were found to be positively linear with both friendship support and mental toughness levels. In addition, according to the findings of friendship support, which is the basic hypothesis of the research, about the mediator role of friend support in relation to motivational self-talk and mental toughness, it has been found that the positive effect of motivational self-talk on mental toughness increases with the support of friends. As a result, it can be concluded that the athletic mental toughness is positively correlated with the motivational self-talk levels, friend support can be used to increase motivational self-talk effect in terms of mental toughness performance.

Keywords: *Motivational Self Talk, Mental Toughness, friend support, Athlete*

Introduction

Mental toughness seems to be one of the most significant psychological constructs related to good sports performance, and therefore in recent research, it has become a focus of attention (Bull et al., 2005, Connaughton et al., 2008, Gucciardi et al., 2009, Jones et al., 2007). Although initial research on mental toughness suffers from some natural weaknesses, recent researches are trying to articulate the conceptual concept of mental toughness (Crust, 2008, Jones et al., 2007). Even though some conceptual differences remain unclear, there seems to be a general idea that mental toughness is a multidimensional structure (Gucciardi et al., 2009, Sheard, 2009). Among the basic qualities that characterize mental toughness are many situations, such as dealing with pressure and troubles, getting rid of failures, insisting or being persistent, being insensitive or having an unwavering grasp on self-control (Crust, 2008).

To date, most of the research on mental toughness has been qualitative and aims to clarify some of the early conceptual uncertainties. While qualitative studies lead to a better understanding of what is mental toughness, most of the reported related variables have not yet been supported by the quantitative methods. Moreover, it can be said that the primary focus given to qualitative research is causing that the development of reliable and valid measures of mental toughness is not given enough importance (Sheard, 2009). In the studies on the level of mental toughness, the variables such as high-intensity exercise (Clough et al., 2002), pain tolerance / physical endurance (Crust & Clough, 2005), sports injury rehabilitation (Levy, Polman, Clough, Marchant and Earle, 2006), optimism and coping (Nicholls, Polman, Levy and Backhouse, 2008), Self-talk (Bayköse et al., 2017), and life satisfaction (Şahin et al., 2017) are discussed.

When it is thought that the theoretical foundations of the concept of mental toughness are based on psychological toughness bases (Kobasa, Maddi, and Kahn, 1982), it has been suggested that there are other factors affecting

psychological toughness in the environment and society in which the individual lives. The presence of an adult providing support and social support outside the home is a protective factor for children and adolescents at high risk (Werner and Smith, 1982; 1992; Benard, 1991; Grizenko and Pawliuk, 1994; Gordon and Song, 1994; Gilligan, 2000; Smokowski, Reynolds and Bezruczko, 2000). In this direction, it can be predicted that friend support is related to mental toughness.

In a similar way to this information and findings, it is thought in our research findings that friend support is also one of the protective or supportive factors in the increase of motivational self-talk which is a positive psychological skill about mental toughness.

In this context, our research hypothesis is defined as follows; H1: Friendship support plays a determining role between the motivational self-talk and the mental toughness in the sportsmen.

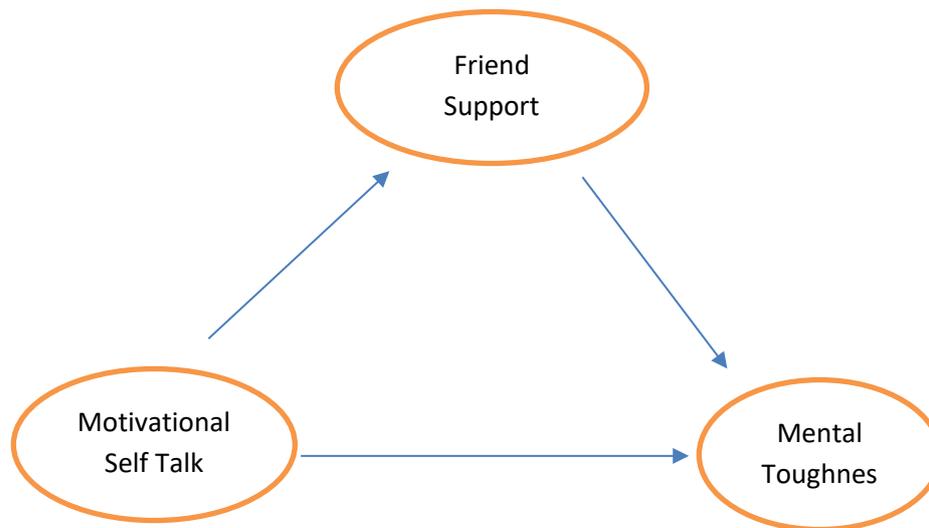
The research methodology of the research hypothesis, which has been established within the main objective of the research, is explained in detail below.

Method

Research Model

This study is a survey of relational screening types designed to examine the intermediary role of perceived friend support levels between motivational self-talk and mental toughness. Karasar (2009) defined relational screening search models as “research models aimed at determining the presence and degree of change between two or more variables”. This model examines the mediating role of friend support levels in the relation between athletes' motivational self-talk and mental toughness levels. Within the scope of the research, hypothesis models are given below;

Figure 1: *Research Model*



Research group

The research group consists of a total of 200 (Agemean: 21,08 + 1,44) athletes in active sports life, 113 women (Agemean: 20,47 + 1,61), and 87 men (Agemean: 21,86 + 3,96).

Data collection tools

For the collection of research data, the subscale of friendship support of the Multidimensional Scale of Social Support, the Mental Toughness Scale, and the Self-Talk Scale's motivational self-talk subscale was used. In addition, personal information about the athletes was obtained through the personal information form created by the researchers.

Multidimensional Scale of Social Support

Multidimensional Scale of Perceived Social Support (MSPSS) is a recognized social support measure developed by Zimet, Dahlem, Zimet et al., (1988) in the United States and the adaptation, validity and reliability studies in

our country are carried out by Eker and Arkar (1995), Çakır and Palabıyık (1997), Eker, Arkar and Yıldız (2001). MSPSS is a user-friendly, 12-item measure that evaluates the adequacy of social support from three different sources (family, friends and a private person) in a subjective way. It includes three groups of sources of social support, each consisting of four items. Suggested subscale structure includes support from "family", "friend" and "special person". Factor analysis supports the three-factor structure (Kazarian and McCabe, 1991; Zimet et al., 1988; Eker and Arkar, 1995). Internal consistency and test-retest correlations of the scale and subscales are adequate. Three groups forming the sample of the Eker et al's study (2001) consists of a group of 150 people of psychiatry, surgical patients, and regular people. The reliability (Cronbach's Alpha) of the entire sample, MSPSS, was calculated as $\alpha = .89$. In the same study, the internal consistencies of the MSPSS and its subscales were found to be acceptable. Each item on the scale uses a 7-point scale ranging between Absolutely no = 1, Absolutely yes = 7. In the study, subscale scores were obtained by summing the scores of the four items in each subscale, and the total score of the scale was obtained by summing all subscale scores. The high score obtained indicates that perceived social support level is high.

Sports Mental Toughness Questionnaire (SMTQ)

In this study, the Sports Mental Toughness Questionnaire developed by Sheard et al. (2009) was used for research purpose. The adaptation of the Sports Mental Toughness Questionnaire to Turkish culture was conducted by Altıntaş and Koruç (2016). The Sports Mental Toughness Questionnaire is a measure of three subscales (Confidence, Control, and Constancy) consisting of a total of 14 items. Total scale score was used in the study. The scale has a 4-point evaluation system. The lowest score that can be earned from the scale is 14, while the highest score is 56.

Self-Talk Questionnaire (STQ)

In this study, Self-Talk Questionnaire developed by Zervas et al. (2007) was used for research purpose. The adaptation of the Self-Talk Questionnaire to Turkish culture was carried out by Engür (2011). The Self-Talk Questionnaire is a measure of two sub-scales (Motivational and Cognitive) consisting of a total of 11 items. Only the motivational self-talk subscale was used in the study. There is a total of 7 items on the motivational self-talk subscale. The scale has a 5-point evaluation system. The lowest score that can be taken from the scale is 7 while the highest score is 35.

Personal information form

In the personal information form created by the researcher, questions were selected to obtain information on the age and gender of the athletes participating in the survey.

Data Analysis

In the data analysis, Pearson correlation analysis was used first to determine the interrelationships of the variables with each other, and PROCESS macro regression analysis was used to determine the influence of friend support on motivational self-talk and mental toughness.

Findings

Table 1: The relationship between friend support, motivational self-talk, and mental toughness

		Motivational Self Talk	Mental Toughnes	Friend Support
Motivational Self Talk	Pearson Correlation	1		
	p			
	n	200		
Mental Toughness	Pearson Correlation	,577**	1	
	p	,000		
	n	200	200	
Friend Support	Pearson Correlation	,219**	,276**	1
	p	,004	,001	
	n	200	200	200

** Correlation is significant at the 0.01 level (2-tailed).

When Table 1 was examined, it was found that the relationship between friend support and motivational self-talk ($r: .219$) was significant ($p < 0.05$), that the relationship between friend support and mental toughness ($r: .276$) was significant, and that the relationship between mental toughness and motivational self-talk ($r: .577$) was significant ($p < 0.05$).

Research Model

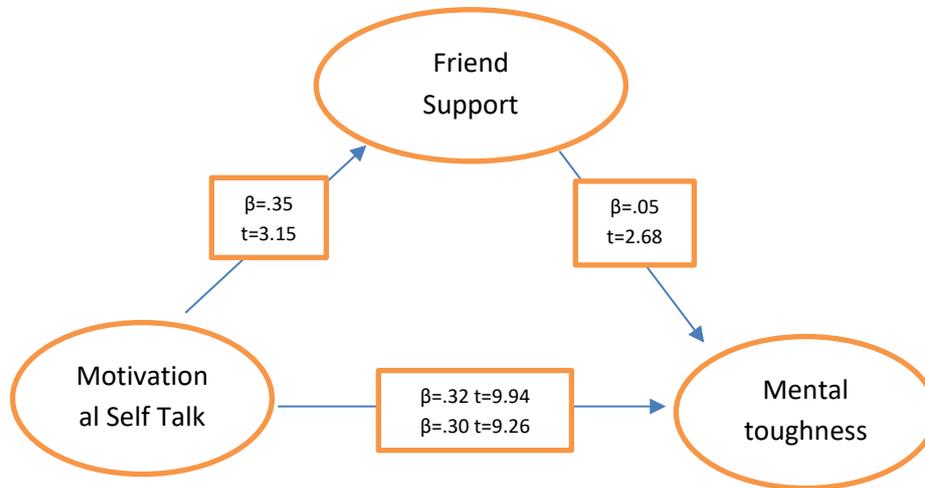


Figure 2: The Mediating Role of the Athletes' Perceived Levels of Friend Support in the Relationship Between Motivational Self-talk and Mental Toughness

Determining that there is a meaningful and positive relationship between motivational self-talk and mental toughness enables the testing of the predicted intermediary relationship. PROCESS macro regression analysis was conducted to test whether friend support played a mediating role between motivational self-talk and mental toughness. In the first step of PROCESS macro regression analysis, only the predictive effect of motivational self-talk on friend support was examined, and it is observed that motivational self-talk ($\beta=.35, t= 3.15, p<.05$) reveals 5% of the total variance for friend support ($R=.22, R^2=.05, F(1,877) = 9,93, p<.05$).

To determine whether friend support plays a mediating role between the motivational self-talk and mental toughness, the predictive influence of motivational self-talk on mental toughness has been investigated in the second stage of PROCESS macro-regression analysis. When findings were examined, it is seen that self-talk ($\beta = .12, t = 2.94, p < .05$) explains 35% of the level of mental toughness ($R=.60, R^2=.35, F(0.155) = 9,27, p<.05$).

In the third step of the PROCESS macro-regression analysis, to determine whether friend support plays a mediating role between motivational self-talk and mental toughness, friend support added in the PROCESS macro-regression analysis and it was found to contribute 5.4% to the explanation of mental toughness. In this respect, it was found that the friend support explained 36% of the total variance in the determination of mental toughness through friend support ($R = .60, R^2 = .36, F(0,155) = 54.616, p < .05$). In the third stage of the analysis, the predictive effect of self-talk on mental endurance decreased ($\beta = .30, t = 9.26, p < .05$). Therefore, it can be said that friend support ($\beta = .22, t = -6.73, p < .05$) is fully mediator in this relationship. The results obtained from the Sobel z test ($Z = 1.99, p < .05$) to determine whether the mediating role of friend support show that this mediating relationship is statistically significant.

Table 3: Findings regarding the direct and indirect effect of friend support on mental toughness

Direct Effect			Effect	S. E	LLCI	ULCI	t	p
Motivational Self Talk	Mental Toughness		.303	.0327	.2386	.3676	9.268	.000
Indirect Effect			Effect	S. E	LLCI	ULCI	t	p
Motivational Self Talk	Friend Support	Mental Toughness	.0192	.0085	.0064	.0414	9.95	.000
Total Effect			.322	.0324	.2584	.3862		
Normal Theory Test for indirect effect								
Effect: .0192		s.e: .0097		z: 1.9878		p: .0468		

Table 5 shows that the total effect of motivational self-talk on the mental endurance (direct effect + indirect effect) is positive ($\beta: 0.303 + 0.0192 = 0.322$) and statistically significant ($p = 0,000$). The Z score (1.9878) for this model is larger than 1.96 and meaningful, so it can be said that the mediator effect exists. Moving from this finding, the hypothesis H1 (friend support has an intermediary role in the influence of motivational self-talk on mental toughness) has been accepted.

Conclusions

This study was a survey of relational screening types designed to examine the intermediary role of perceived friend support levels between motivational self-talk and mental toughness. A total of 200 athletes participated voluntarily in the survey, 113 men and 87 men, who were active in their sports lives. After the research, it was determined that the relationship between friendship support and motivational self-talk was meaningful, the relationship between friend support and mental toughness was meaningful. It was also determined that the relationship between mental toughness and motivational self-talk is significant. When this type of information is examined in the literature, the research findings made by Bayköse et al. (2017a) on the sample of athletes trained in sports sciences show similar results to our research findings.

Based on our research findings, it has been determined that motivational self-talk has a positive effect on total mental toughness and it is statistically significant. According to the results obtained, it can be said that the friend support has a mediator role. Moving from this finding, it has been determined that friend support has an intermediary effect on the influence of motivational self-talk on mental toughness. In these findings, social support has become a major issue in the literature of coping (Andersen & Williams, 1999; Hardy, Richman and Rosenfeld, 1991; Petrie, 1992, 1993a; Smith et al., 1990). Malecki and Demaray (2003) state that overall perceived support or exceptional supportive behaviors or social environment can guard individuals from adverse consequences. In this context, it can be said that this information supports our research results. In other words, it is supported by the findings that friendship support between mental toughness and motivational self-talk is a positive factor. Because of the basic characteristics that characterize spiritual toughness, we have noted that there are many situations, such as dealing with pressure and troubles, getting rid of failures, insisting or being persistent, being insensitive or having an unwavering grasp on self-control (Crust, 2008).

As a result, it can be said that the mental toughness of athletes is positively correlated with the motivational self-talk levels, and the friend support can be used to increase the motivational self-talk effect for the mental toughness performance.

Author Note

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References

- Andersen, M. B., & Williams, J. M. (1999). Athletic injury, psychosocial factors and perceptual changes during stress. *Journal of Sports Sciences*, 17, 735–741.
- Hardy, C. J., Richman, J. M., & Rosenfeld, L. B. (1991). The role of social support in the life of stress/injury relationship. *The Sport Psychologist*, 5, 128–139.
- Petrie, T. A. (1992). Psychosocial antecedents of athletic injury: The effects of life stress and social support on female collegiate gymnasts. *Behavioral Medicine*, 18, 127–138.
- Petrie, T. (1993a). The moderating effects of social support and playing status on the life stress- injury relationship. *Journal of Applied Sport Psychology*, 5, 1–16. doi:10.1080/10413209308411301
- Smith, R. E., Smoll, F. L., & Ptacek, J. T. (1990). Conjunctive moderator variables in vulnerability and resiliency research: Life stress, social support, coping skills, and adolescent sport injuries. *Journal of Personality and Social Psychology*, 58, 360–370.
- Malecki, C. K., & Demaray, M. K. (2003). What type of support do they need? Investigating student adjustment as related to emotional, informational, appraisal, and instrumental support. *School Psychology Quarterly*, 18, 231–252.
- Bull, S., Shambrook, C., James, W., & Brooks, J. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of Applied Sport Psychology*, 17, 209–227.
- Clough, P. J., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 32–43). London: Thomson Publishing
- Connaughton, D., Wadey, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: Perceptions of elite performers. *Journal of Sport Sciences*, 26(1), 83–95.
- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences*, 45(7), 576–583.

- Crust, L., & Clough, P. J. (2005). Relationship between mental toughness and physical endurance. *Perceptual and Motor Skills*, 100, 192–194
- Gucciardi, D., Gordon, S., & Dimmock, J. (2009). Evaluation of a mental toughness training programme for youth-aged Australian footballer:1. A quantitative analysis. *Journal of Applied Sport Psychology*, 21, 307–323.
- Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21, 243–264.
- Kobasa, S. C., Maddi, S. R., & Kahn, S. (1982). Hardiness and health: A prospective study. *Journal of Personality and Social Psychology*, 42, 168–177
- Sheard, M. (2009). *Mental toughness: The mindset behind sporting achievement*. London, UK: Routledge
- Levy, A. R., Polman, R. C., Clough, P. J., Marchant, D. C., & Earle, K. (2006). Mental toughness as a determinant of beliefs, pain, and adherence in sport injury rehabilitation. *Journal of Sport Rehabilitation*, 15(3), 245-254.
- Nicholls, A. R., Polman, R. C., Levy, A. R., & Backhouse, S. H. (2008). Mental toughness, optimism, pessimism, and coping among athletes. *Personality and individual differences*, 44(5), 1182-1192.
- Werner, E. E. ve Smith, R. S. (1982). *Vulnerable but invincible: A longitudinal study of resilient children and youth*. New York: McGraw-Hill.
- Werner, E. E. ve Smith, R. S. (1992). *Overcoming the odds: High risk children from birth to adulthood*. Ithaca, NY: Cornell University Press
- Benard, B. (1991). *Fostering resiliency in kids: Protective factors in the family, school, and community*. Portland, OR: Northwest Regional Educational Laboratory.
- Gilligan, R. (2000). Adversity, resilience and young people: The protective value of positive school and spare time experiences. *Child and Society*, 14(1), 37-47.
- Gordon, E. W. ve Song, L. D. (1994). Variations in the experience of resilience. (Ed: M. C. Wang ve E. W. Gordon) *Educational Resilience in Inner-City America: Challenges and Prospects*. New Jersey: Lawrence Erlbaum Associates, Publishers.
- Grizenko, N. ve Pawliuk, N. (1994). Risk and protective factors for disruptive behavior disorders in children. *American Journal of Orthopsychiatry*, 64, 534-544.
- Smokowski, P. R., Reynolds, A. J. ve Bezruczko, N. (2000). Resilience and protective factors in adolescence: An autobiographical perspective from disadvantaged youth. *Journal of Social Psychology*, 37,4, 425-448.
- Bayköse, N., Civar Yavuz, S., Özer, Ö., & Şahin, A. (2017). The role of self-talk and self-efficacy levels of athletes studying at faculties of sport sciences on predicting mental toughness. *Turkish Online Journal of Educational Technology*, (December Special Issue), 591-595.
- Şahin, A., Bayköse, N., & Civar Yavuz, S. (2017). The role of motivational self-talk and life satisfaction on determining the flow experience of undergraduate athletes. *Turkish Online Journal of Educational Technology*, (December Special Issue), 867-871.
- Engür, M. (2011). Performans Başarısızlığı Değerlendirme Envanteri ve Kendinle Konuşma Anketinin Türk Sporcu Popülasyonu'na Uyarlanması ve Uygulanması. Yayımlanmamış Doktora Tezi, Ege Üniversitesi, İzmir.
- Zervas, Y., Stavrou N. ve Psychountaki M. (2007). Development and Validation of The Self-Talk Questionnaire (S-Tq) For Sports. *Journal of Applied Sport Psychology*, 19, 142-159.
- Sheard M. (2013). *Mental Toughness: The Mindset Behind Sporting Achievement*. Second Edition, Hove, East Sussex: Routledge
- Altıntaş, A., & Koruç, P. B. (2016). Sporda Zihinsel Dayanıklılık Envanteri'nin Psikometrik Özelliklerinin İncelenmesi (SZDE). *Spor Bilimleri Dergisi*, 27(4), 163-171.
- Çakır, Y. & Palabıyık, R. (1997). Gençlerde Sosyal Destek, Çok Boyutlu Algılanan Sosyal Destek Ölçeğinin Güvenilirlik ve Geçerlilik Çalışması. *Kriz Dergisi*, 5(1), 15-24.
- Kazarian, S.S. & McCabe, S.B. (1991) Dimensions of social support in the MSPSS: Factorial structure, reliability, and theoretical implications. *J Community Psychol*, 19, 150-160.
- Zimet, G.D., Dahlem, N.W., Zimet, S.G. & et all. (1988). The Multidimensional Scale of Perceived Social Support. *J Pers Assess*, 52, 30-41.
- Eker, D. & Arkar, H. (1995). Çok Boyutlu Algılanan Sosyal Destek Ölçeğinin Faktör Yapısı, Geçerlilik ve Güvenirliği. *Türk Psikologlar Dergisi*, 10(34), 45-55.
- Eker, D. Arkar, H. Yıldız, H. (2001). Çok Boyutlu Algılanan Sosyal Destek Ölçeği'nin Gözden Geçirilmiş Formunun Faktör Yapısı, Geçerlik ve Güvenirliği, *Türk Psikiyatri Dergisi*, 12(1):17-25.

Multicultural Education Management Model Of An International School In A Thai Private School

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Abstract

This research aims to study components of Multicultural Education management in a Thai private international school, and the development of a Multicultural Education management model at Mataneedol School. This study involved research and development and was split into 3 phases. Phase 1; studied document synthesis and in-depth interviews by seven qualified experts designated for each specific group. Instruments used structured interviews and content analytics. Phase 2; developed a model using best practices from three outstanding schools and Multi-Attribute Consensus Reaching (MACR) by a group of ten experts who selected specific instruments, using best practices study, critical assessment, and content analytics. Phase 3; studied and evaluated the model by putting it into practice at Mataneedol School beginning in the 2nd semester of the academic year 2017. Actioned research using participatory observation, interviews, meeting notes, teachers lesson plans, student appraisal work, and quality of Multicultural Education management 'assessment by using synthesis and quantitative data content, with consideration to process and results dimension, improve data and present Multicultural Education at Mataneedol School, researchers found the following: Multicultural Education management model of an international Thai private school consisted of 7 elements. (1) Vision and commitment to the education of everyone (2) Development of a global curriculum (3) Learning activities focused on the construction of knowledge (4) Creation of a climate conducive to learning, social structure, and culture within the school (5) Teaching based on social justice (6) Prevention of prejudice against the rights and equality of everyone (7) Enhancement of multicultural, collaboration, and student achievement. The relationship between components in the Multicultural Educational management model at Mataneedol School under the schemes enterprise, environment, relationship, and challenge was divided into 7 elements which included 34 practical indicators. The overall quality of Multicultural Education at Mataneedol School is in the ranges of "Most" ($\mu = 4.58, \sigma = 0.56$). The overall administrative quality of Multicultural Education of Mataneedol School is in ranges of "Most" ($\mu = 4.57, \sigma = 0.58$).

Keywords: *Multicultural Education Management Model, International School, Thai Private School, Mataneedol School*

Introduction

Educational management in schools with students from different ethnic and cultural backgrounds. Most of them cannot meet the needs and the style of learning which varies by race, religion, and culture, resulting in unsuccessful students who suffer in school, both emotionally and socially. This can lead to a lack of suitable life skills and academic achievement. (Jenks, Lee & Kanplo, 2001) Therefore, it is essential that educational institutions and teachers consider an appropriate educational management model in line with the cultural diversity of the learners it serves. It is paramount that students are educated in an environment where democracy, equality, freedom, and justice, prevail and where students feel confident to develop positive ideas. Students should be encouraged to show respect for and acceptance of multicultural differences. (Grant & Ladson – Billings, 1997) All educational establishments should adopt and promote an atmosphere of mutual respect and fairness among its multicultural students. (Banks, 2001)

Education in schools with children from different cultures is called "Multicultural Education", which means that school administrators, teachers, and parents create school and classroom environments which are conducive to learning and aware that racial or ethnic backgrounds, languages, religions, traditions, and lifestyles all affect a student's ability to learn. We must learn to accept cultural differences, without showing prejudice or discrimination. (Yongyaun, et al., 2010) Learning the culture of others in terms of beliefs, values, behaviors, and traditions is an important starting point for peace and harmony among human beings. Educators are of vital importance in preparing the new generation to be ready to live and learn in a multicultural community of different cultures. (Wan, 2006)

Multicultural education in Thailand is required in order that we can comprehensively manage and develop models of multicultural education which are clearly understood in our schools. Administrators and teachers in the education system of the educational reform era, are expected to have the potential to become a significant force within Thai society. Researchers study the components of multicultural education based on the concept of educators, synthesized the elements that can be used as a Multicultural Education management model within the

Thai private school system consisted of 7 elements. **(1) Vision and commitment to education of everyone** (Banks, 1994; Grant & Sleeter, 2003; Ameny-Dixon, 2004; Rios, 2012) **(2) Development of global curriculum** (Banks, 1994, 2001, 2002, 2008, 2016; Grant & Sleeter, 2003; Ameny-Dixon, 2004; Gates, 2006; Rios, 2012; Ford, 2014; Yongyaun, et al., 2010) **(3) Learning activities focused on construction of knowledge** (Banks, 2001, 2002, 2008, 2016; Gates, 2006; Yongyaun, et al., 2010) **(4) Creation of a climate conducive to learning, social structure, and culture within schools** (Banks, 1994, 2001, 2002, 2008, 2016; Grant & Sleeter, 2003; Gates, 2006; Yongyaun, et al., 2010) **(5) Teaching based on social justice** (Banks, 1994, 2001, 2002, 2008, 2016; Grant & Sleeter, 2003; Ameny-Dixon, 2004; Gates, 2006) **(6) Prevention of prejudice against rights and equality of everyone** (Banks, 1994, 2001, 2002, 2008, 2016; Ameny-Dixon, 2004; Gates, 2006; Ford, 2014) **(7) Enhancement of multicultural, collaboration, and student achievement.** (Banks, 1994; Grant & Sleeter, 2003; Ameny-Dixon, 2004; Rios, 2012)

Therefore, the development of a Multicultural Education management model within an international school in the Thai private school system can improve the overall success of student achievement. This is due to the dimension of the viewpoints of school administrators as a guideline for education that is consistent with the development problems within the country, encourage the Multicultural Education management model in context in schools to bring their schools up to the world-class standard, and distributed to schools with a similar context, has applied to develop the students to be good citizens of the future.

The Study

This research aims to show the components of a Multicultural Education management model of an international school in the Thai private school system and the development model of Multicultural Education management at Mataneedol School.

This study included research and development, and was split into 3 phases:

1) Phase 1 was a study of the components of Multicultural Education at international schools in the Thai private school system by incorporating document research and expert interviews. It consists of two steps:

1.1) Synthesis of elements of Multicultural Education by synthesizing the literature and related research. The researcher studied the components of multicultural education based on the concepts of Banks (1994, 2001, 2002, 2008, 2016); Grant & Sleeter (2003); Ameny-Dixon (2004); Gates (2006); Rios (2012); Ford (2014); Yongyaun, et al. (2010), synthesized the elements that can be used as Multicultural Education management model within Thai private schools consisted of 7 elements. (1) Vision and commitment to the education of everyone (2) Development of a global curriculum (3) Learning activities focused on the construction of knowledge (4) Creation of a climate conducive to learning, social structure, and culture within the school (5) Teaching based on social justice (6) Prevention of prejudice against the rights and equality of everyone (7) Enhancement of multicultural, collaboration, and student achievement.

1.2) Feasibility study Multicultural Education management at an international school in the Thai private school system by utilizing in-depth interviews with 7 specific experts and purposive sampling. Instruments used in the research were semi-structured Interviews, using content analysis.

2) Phase 2 was the development of a Multicultural Education management model of an international school in Thai private school system. A study using best practices of organizations which performed well on the subject, and Multi-Attribute Consensus Reaching (MACR), consisting of two steps:

2.1) Study of promotion factors and obstacles, then draft a Multicultural Education management model of an international school in the Thai private school system. By using best practices from a sample of schools in multicultural education was selected to be successful of three specific outstanding schools. Instruments used in this study were interviews, observation, and study document forms used content analysis.

2.2) Development of Multicultural Education management model of an international school in the Thai private school system by using Multi-Attribute Consensus Reaching, selected expert group based on the concept of Kanchanavasi (2003), 10 selected experts were divided into 5 academics and 5 practitioners. Instruments used in this study was an assessment of the importance of Multicultural Education of an international school in the Thai private school system, data were analyzed by using basic statistics such as frequency, percentage, and mean.

3) Phase 3 was an evaluation of the Multicultural Education management model at Mataneedol School, by putting the model into practice at the school, to evaluate the feasibility of using Multicultural Education management model, consists of two steps:

3.1) Examine suitability and feasibility of the Multicultural Education management model at Mataneedol School, using action research methods and putting the model into practice in the first semester of the

Mataneedol school year, by purposive sampling. Operation in the second semester of the academic year 2017, was divided into two loop cycles with 8 steps, 4 steps per cycle.

3.2) Evaluation of Multicultural Education management model at Mataneedol School, used participatory observation, interviews, meeting notes, Teacher lesson plans, examination of student tasks, and evaluation of the quality manuals and the Multicultural Education management model at Mataneedol School. Then synthesize information, improve the Multicultural Education management model at Mataneedol School again, with consideration of process and output dimensions. Data were analyzed using content analysis and basic statistics such as frequency, percentage, and mean.

Findings

1) The Multicultural Education management model of an international school in Thai private school system consisted of 7 elements with 30 indicators; (1) Vision and commitment to the education of everyone, consisted of 4 indicators (2) Development of global curriculum, included 5 indicators (3) Learning activities focused on knowledge construction, included 3 indicators (4) Creation of a climate conducive to learning, social structure, and culture within school, had 5 indicators (5) Teaching based on social justice included 4 indicators (6) Prevention of prejudice against rights and equality of everyone, had 4 indicators (7) Enhancement of multicultural, collaboration, and student achievement, had 5 indicators.

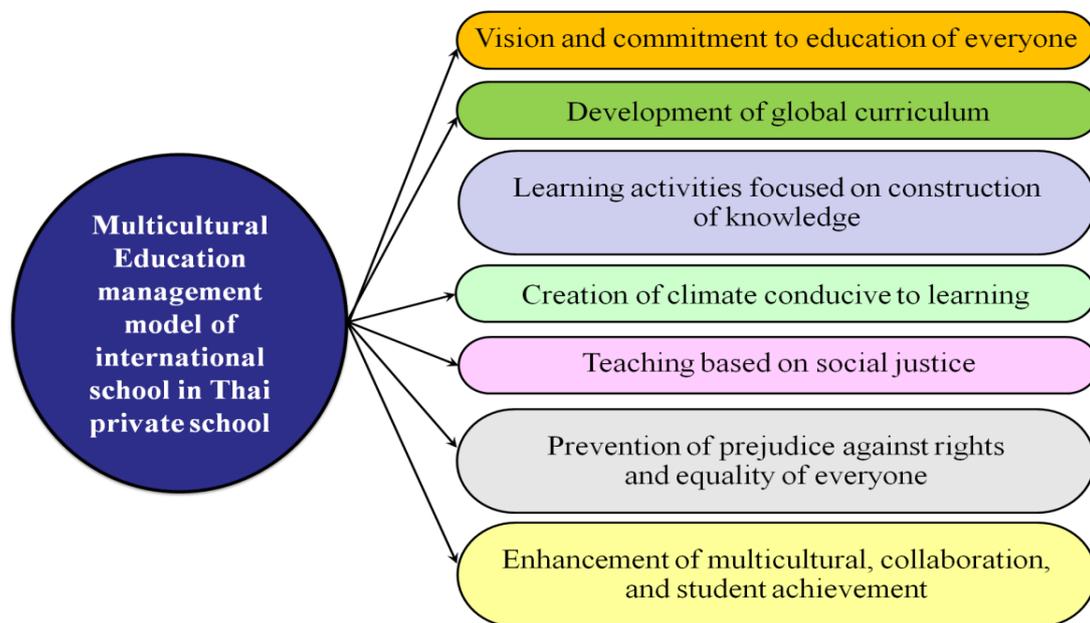


Figure 1: The graphic shows the Multicultural Education management model Of an international school in the Thai private school system.

2) The Multicultural Education management model of an international school in Thai private school system; in each issue had an average score ranging from 88.00 to 98.00 and there was a range of scores between the two experts' groups, i.e. the academic group and the practice group from 0.00 to 16.00. Show that all aspects of Multicultural Education management model was "most important" and had a range different "less".

3) The relationship between components in Multicultural Educational management model at Mataneedol School under schemes enterprise, environment, relationship, and challenge was divided into 7 elements with 34 practical indicators; (1) Vision and commitment to education of everyone, includes 4 indicators (2) Development of global curriculum, includes 5 indicators (3) Learning activities focused on knowledge construction, includes 3 indicators (4) Creation of a climate conducive to learning, social structure, and culture within school, includes 6 indicators (5) Teaching based on social justice, includes 5 indicators (6) Prevention of prejudice against the rights and equality of everyone, includes 5 indicators and (7) The enhancement of multicultural, collaboration, and student achievement, includes 6 indicators.

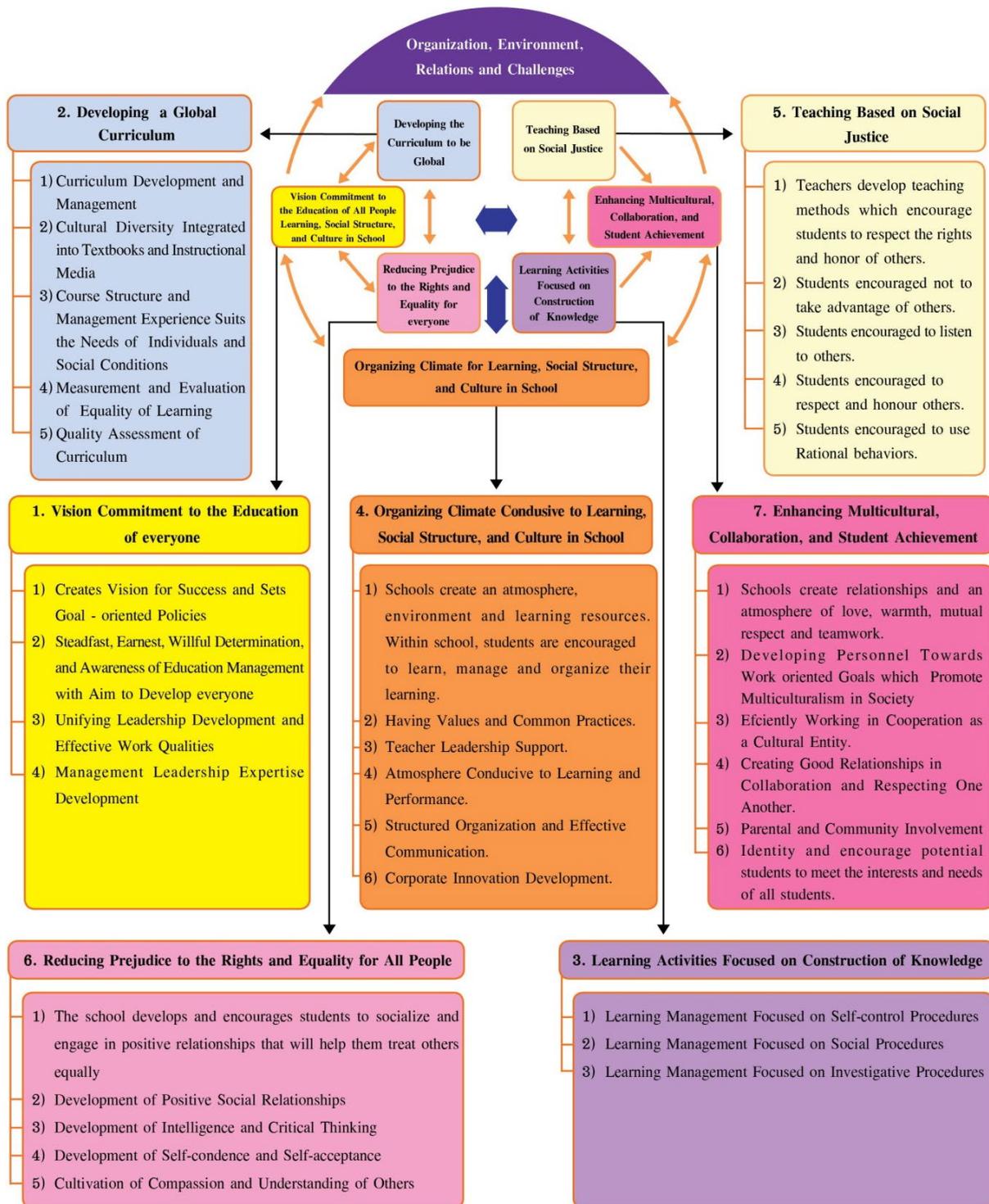


Figure2: The graphic shows the Multicultural Educational management model at Mataneedol School under schemes enterprise, environment, relationship, and challenge.

The overall quality of Multicultural Education at Mataneedol School are in ranges of “Most” ($\mu = 4.58, \sigma = 0.56$). The overall administrative quality of Multicultural Education of Mataneedol School is in ranges of “Most” ($\mu = 4.57, \sigma = 0.58$).

Conclusions

1) The Multicultural Education management model of an international school in the Thai private school system consisted of 7 elements. (1) Vision and commitment to education of everyone (2) Development of global curriculum (3) Learning activities focused on knowledge construction (4) Creation of a climate conducive to learning, social structure, and culture within school (5) Teaching based on social justice (6) Prevention of prejudice against the rights and equality of everyone (7) Enhancement of multicultural, collaboration, and student achievement. Because of Multicultural Education' elements were related to six components of the education; (1) purpose (2) curriculum (3) teacher (4) student (5) instructional process and (6) administration. This corresponds to the concept of Banks (1994, 2001, 2002, 2008, 2016); Grant & Sleeter (2003); Ameny-Dixon (2004); Gates (2006); Rios (2012); Ford (2014); Yongyaun, et al. (2010). In addition, seven in-depth interviews were developed following the Hypothesis Model. Mostly, study methodology was used for interviews, surveys, group discussions, etc. The results of the study will be used to determine the components or variables in the model, including the nature of the relationship between the elements or variables, or the sequence of preceding elements in the form. In this stage, the principle of rationality is essential. (Pengsawat, 2010)

2) The Multicultural Education management model of an international school in Thai private school system; In each issue averages a score in the range of 88.00 to 98.00 and there was a range of scores between the two experts' groups, i.e. The academic group and the practice group from 0.00 to 16.00. Reveals that all aspects of the Multicultural Education management model was "most important" and had a range difference "less". Because the model was drafted by studying the Best Practice models of three international schools, to achieve the Multicultural Education management model at Mataneedol School. This is a case study of real situations and problems found whilst developing this Multicultural Education Model, the opinions of experts by interview, group discussions, and case studies of the organization which performs well in the study and is based on the concept of Pengsawat (2010). Then set-up meetings for Multi-Attribute Consensus Reaching (MACR), was used to consider the importance and necessity of the Multicultural Education management model at Mataneedol School by writing a score on the scoreboard. Evaluation scores were based on the concepts of King, et al. (2001).

3) The relationship between components in the Multicultural Educational management model at Mataneedol School under schemes enterprise, environment, relationship, and challenges are divided into 7 elements with 34 practical indicators; (1) Vision and commitment to education of everyone, includes 4 indicators (2) Development of a global curriculum includes 5 indicators (3) Learning activities focused on knowledge construction includes 3 indicators (4) Creation of a climate conducive to learning, social structure, and culture within school, includes 6 indicators (5) Teaching based on social justice, includes 5 indicators (6) Prevention of prejudice against the rights and equality of everyone includes 5 indicators (7) Enhancement of multicultural, collaboration, and student achievement includes 6 indicators. The overall quality of Multicultural Education at Mataneedol School are in ranges of "Most" ($\mu = 4.58, \sigma = 0.56$). The overall administrative quality of Multicultural Education of Mataneedol School is in the ranges of "Most" ($\mu = 4.57, \sigma = 0.58$). Because this phase incorporated an action and a study of the research collaboration within the organization was needed by focusing on the work involved during all stages of research from defining the problem, choosing a solution, and developing the solution. This is inline with String's (1996) concept that participatory action research evaluation was an important tool in creating new knowledge and practical sharing in every step. The concept of Kemmis & McTaggart (1998) was that operational research is a cyclical process of planning, action, observing, and reflecting. Including the evaluation of the quality of Multicultural Educational management model at Mataneedol School in this institution, researchers evaluated their approach to the National Quality Award (TQA). Based on the concept of the National Quality Award Office (2011), a new quality management technique was used in both the business and government sectors.

Suggestions

The suggestions for using the research results are as follows: (1) The Office of the Private Education Commission (ECDC) has proposed the policy on Multicultural Education that is consistent with the developmental problems of the country. (2) Private schools collate research results to help in the future with new elements of Multicultural Education that will fit into the context of international schools in Thailand. (3) School administrators of private schools can utilize research results and use them as a guideline for planning Multicultural Education management in other international schools.

Suggestions for the next research; (1) there should be quantitative research, to help enhance the knowledge and diversity, such as the need to explore, the need for assessment of the structural model, etc. By utilizing the results of this research as a guide. (2) There should a comparative study of the elements of multicultural education in international schools under the Private Education Commission and under the Government Education Commission guidelines for promoting Multicultural Education in international schools should match their organizations in order

to properly develop the policy. (3) They should study the components of Multicultural Education in other international schools. In addition to this research, such as organizational culture Resource management, etc., to gain more relevant factors in promoting Multicultural Education in international schools. (4) There should research on non-institutional organizations, to determine whether each context of the organization has elements of Multicultural Education difference.

References

- Ameny-Dixon, Gloria M. (2004). Why multicultural education is more important in higher education now than ever, a global perspective. **Intellectual scholarly diversity journal**, 8(1): 1-9.
- Banks, James A. (1994). **Multiethnic education: Theory and practice**. 3rd edition. Boston: Allyn & Bacon.
- _____. (2001). **Cultural diversity and education: Foundations, Curriculum, and teaching**. Boston: Allyn and Bacon.
- _____. (2002). **An Introduction multicultural education**. Boston: Allyn& Bacon.
- _____. (2008). **An Introduction multicultural education**. 4th edition. Boston: Pearson Education.
- _____. (2016). **Cultural diversity and education**. 6th edition. Routledge Taylor & Francis Group: New York and London
- Banks James A. & Cherry A. McGee Banks. (2010). **Multicultural education: issues and perspectives**. Hoboken, NJ: Wiley.
- Ford, Donna Y. (2014). Why Education Must Be Multicultural Addressing a Few Misperceptions with Counterarguments. **Gifted Child Today**, 37(1): 59-62.
- Gates, Kevin D. (2006). Multicultural Education in Public Elementary Schools. (Doctoral dissertation, University of Denver, 2006). **Digital Dissertations**. Retrieved February 10, 2016, from <http://proquest,umi.com>
- Grant, C.A. & Sleeter, C.E. (2003). **Turning on learning: Five approaches for multicultural teaching plans for race, class, gender, and disability**. 3rd edition. New York: Wiley.
- Grant, Carl A. & Ladson – Billing, Gloria. (Eds). (1997). **Dictionary of multicultural education**. Phoenix, Arizona: Oryx Press.
- Jenks, C., Lee, J.O. & Kanpol, B. (2001). Approaches to multicultural education in preserve teacher education: Philosophical frameworks and models for teaching. **The urbanview**, 33(2): 87–105.
- Kanchanavasi, S. (2003). **Selection of appropriate statistics for research**. 3rd edition. Bangkok: Boonsiri Printing.
- Kemmis, S., & McTaggart, R. (1998). **The Action Research Planner**. 3rd edition. Victoria: Deakin University Press.
- King, J.A., et al. (2001). Toward a taxonomy of essential evaluation competencies. **American journal of Evaluation**, 22: 229-247.
- McClelland, D.C. (1973). Testing for competence rather than for intelligence. **American Psychologist**, 28(1): 1-14.
- National Quality Award Office. (2011). **TQA Criteria for Performance Excellence**. Bangkok: SiviGold Media.
- Nieto, S. & Bode, P. (2012). **Affirming diversity: The sociopolitical context of multicultural education**. Boston, MA: Pearson Education.
- North Central Regional Educational Laboratory (NCERL). (2009). **Critical issue: Technology leadership: Enhancing positive educational change**. Retrieved August 20, 2015, from <http://www.ncrel.org/sdrs/areas/issues/educatrs/leadership/le700.htm>.
- Pengsawat, W. (2010). Research Development. **Journal of Sakon Nakhon Rajabhat University**, 2(4): 1-15.
- Rios, Sylvia G. (2012). **A case study of principal leadership in the practice of multicultural education in high-achieving schools serving Hispanic students in south Texas**. A Dissertation Submitted to Ph.D. Curriculum and Instruction Major of Texas A & M University.
- Stringer, E. (1996). **Action Research: A handbook for practitioners**. Thousand Oaks: Sage Publications.
- Wan, Guofang. (2006). Teaching diversity and tolerance in the classroom: A thematic storybook approach. **Education**, 127(1): 140-154.
- Yongyaun, B., et al. (2010). **Development of Multicultural Education model in primary schools**. Office of the National Culture Commission, Ministry of Culture.

Multi-Level Structural Equation Model Of Factors Affecting The Learning Innovation In Thai Schools

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Abstract

The purpose of this research was to examine the structural equation model (SEM) of factors that affecting teachers' learning innovation in schools using multi-level methodology. Researchers employed a mixed mode design utilizing qualitative and quantitative methods to collect data. A total of five experts and practitioners were involved in in-depth interview at the first phase to identify the factors that affecting teachers' learning innovation. Qualitative findings from the first phase coupled with the literature reviews assisted researchers proceed to second phase using SEM with a total samples of 1,621 principals and teachers from 416 schools that affiliated to the Thailand Office of Basic Education Commission using multi-stage random sampling technique. Qualitative data was analyzed by using content analysis while quantitative data was analyzed using M-Plus program. A survey was employed at the second phase using questionnaire as an instrument. Findings from the first phase indicated that there are seven primary factors, 26 secondary factors, and 73 indicators of teachers' learning innovation. The quantitative findings indicated that the structural equation model of teachers' learning innovation factors has goodness fit with evident data with $\chi^2 = 1,012.203$, $df = 568$, $p = .052$, $\chi^2/df = 1.801$, $CFI = .953$, $TLI = .932$, $RMSEA = .010$, and $SRMRw = .181$, and $SRMRb = .242$.

Keywords: *Educational policy; professional learning community; self-efficacy; school leadership; teachers' learning innovation*

Introduction

In recent decades, global trends in cultural and economic development have brought forth reforms in the ways teachers design the curriculum (Naz & Murad, 2017). Therefore, teachers are professionals who can think about and look for innovative solutions when they face new problems but not technicians who implement the educational ideas and approaches of others only (Paniagua, 2018). Teachers play a crucial role in the interpretation of an innovative design and its translation to educational practice (Könings, Brand-Gruwel, & van Merriënboer, 2006). It is essential that educational innovations have to recognize the need of teachers' learning because they are the most important agents in shaping education for students and in bringing about change and innovation in educational practices (Bakkenes, Vermunt, & Wubbels, 2010).

Commitment to continuous teachers' learning innovation is crucial for the success of education reform, instructional improvement, and students' achievement (Bae, Hayes, Seitz, O'Connor, & DiStefano, 2016). Current educational policies are more concerned about equality of opportunity for education and employment opportunities for graduates (Teichler, 2004). As a result, Thailand's strategic plan for the Second Decade of Education Reform (2009-2018) has emphasized the importance on the quality of life-long learning among Thai people. Teachers' learning innovation is believed would be a strong foundation to improve the quality of education which in line with the standard and the transformation of the society (Aritatana, Sirisooksilp, & Tang, 2016). This is further supported by Somprach, Tang, and Popoonsak's (2017) study. Somprach et al. found that effective school principals have to foster and manage school cultures to develop collaborative working relationships and support on-going learning for students and teachers. This implies the importance of school leadership to promote teachers' learning innovation.

Owen (2015) interviewed teachers from three innovative case-study schools to investigate whether there are links between students' learning achievement and teachers' learning within professional learning communities. Owen had successfully provided specific examples of professional learning communities learning processes with regard

to co-planning, co-teaching, and co-assessment. Owen's findings revealed that professional learning communities are supported teachers' changes in their teaching practices that relevant to innovative contexts by utilizing the research instruments such as students' work samples and achievement data as well as teachers' observations and self-reports. Furthermore, teachers indicated that their participations in innovative professional learning communities had successfully increased students' learning outcomes in term of achievement, social skills, emotional aspects, more independence and creativity. The overall key impacts arising from professional learning communities operating within innovative contexts have improved the well-being of teachers and students. Finally, Owen concluded that teachers' innovative teaching approaches require changes to the traditional teacher role towards operating as co-facilitators, co-learners, and working in teacher teams, with considerable innovative professional learning communities.

Hsiao, Chang, Tu, and Chen (2011) found that teachers' self-efficacy is associated with their adoption of innovation. Moreover, their results showed that teachers' self-efficacy can predict their goals and attitudes toward innovation and change. They concluded that teachers with high efficacy are more likely to undertake more challenging activities that involving more creative practices. Cachia, Ferrari, Ala-Mutka, and Punie (2010) reported that many teachers and education experts felt that the curriculum in their countries is insufficient to encourage creativity and innovation mainly because they themselves are not clear how creativity should be defined and how it should be treated in learning and assessment. This situation become worse when curriculum are overloaded with content, which reduces the possibilities of creative and innovative learning approaches in practice.

Literature Reviews

Naz and Murad (2017) aimed to investigate the use of teachers' innovative strategies to respond to students' diversity at higher education level in public and private sector of Pakistan. Their findings showed that if teachers who used innovative teaching methods, can work effectively on students' diversity and will be able to enhance their performance. Moreover, their findings indicated that the innovation is more applied in private-sector universities than the public-sector universities. In addition, they found that the use of innovative strategies is more and highest in the discipline of humanities through mathematics subject. This implies that different disciplines of teachers perceived innovative learning differently. Teachers of humanities find the innovative strategies are more effective and easy to use particularly in mathematics teaching. Finally, they found that the class size decreases the effect of innovative strategies of teaching. In other word, the larger class size, the less impact of innovative teaching.

Barrett and Breyer (2014) found that school leaders must instill passion in teachers and provide effective leadership to motivate teachers to be innovative to engage and energize their students while they are teaching. Their study was focused on how modeling instructional strategies by school leaders to influence teachers' implementation of innovative strategies that promote greater student engagement and learning. They suggested that effective leadership and modeling can sustain teachers' passion for teaching and also provide them with the motivation to engage students in their lessons.

Cheng and Wu (2016) studied the learning experiences of teachers' professional development in Chinese secondary schools under a socio-cultural framework. Their findings revealed that social and individual affordances are very important to teachers' professional development and is prerequisite to the sustainable growth of teacher learning community. Cheng and Wu's findings were supported by past researchers such as Bae, Hayes, Seitz, O'Connor, and DiStefano (2016) and Morgan, Farkas, Hillemeier, and Maczuga (2016) who pointed out the importance of teachers working in professional learning communities to implement reformed teaching as they share knowledge and resources, critically examine and reflect on one another's practices, and use innovative evidence from student work and classroom observation to inform instruction.

Educational policy can be an important factor to cultivate a creative and integrative teacher. Therefore, South Korea has adopted a new national curriculum to promote flexibility and creativity of teachers on how the students address the new challenges of the 21st century (Cho & Huh, 2017). Moreover, there are six key competencies as the core skills for Korean students in the new educational policy, namely self-management, knowledge and information processing, creative thinking, aesthetic sensibility, communication skills, and civic competency. These competencies are found to be in line with Thailand Second Decade of Educational Reform (2009-2018) that highly emphasize the importance on the quality of life-long learning (Aritatana, Sirisooksilp, & Tang, 2016).

Research Objectives

Based on the literature reviews above, researchers would like to study the multi-level structural equation model of teachers' learning innovation at schools which affiliated to the Office of Basic Education Commission in Thailand. The following are the specific objectives of this study:

- i. To explore the primary factors, secondary factors, and indicators of teachers' learning innovation in a multi-level structural equation model.
- ii. To examine the congruence of the structural model with empirical data.

Methodology

This research consisted of two phases employing a mixed mode design to collect the qualitative data and quantitative data respectively. The in-depth interviews were the technique used to elicit a vivid picture of the five experts or practitioners' perspective on the factors of teachers' learning innovation. Researchers used qualitative research paradigm that was in-depth interview for the first phase in order to identify teachers' learning innovation factors of structural equation model. Purposive sampling technique was employed for the first phase for the identification and selection of information-rich cases for the most effective use of limited resources (Patton, 2002). This involves identifying and selecting individuals that are especially knowledgeable or experienced with this phenomenon of interest (Cresswell & Plano Clark, 2011). In addition to knowledge and experience, Bernard (2002) noted the importance of availability and willingness to participate, and the ability to communicate experiences and opinions in an articulate, expressive, and reflective manner.

After researchers conducted the in-depth interviews with the five experts or qualified practitioners to examine how they viewed the teachers' learning innovation factors and further to examine if they agreed with the results. Mixed mode design is referred as a combination of different modes of collecting data for a single research. Researchers intend to use the qualitative data analysis from the in-depth interviews to assist in explaining and interpreting the findings of the quantitative data at second phase (Creswell, 2014). At the second phase, a survey quantitative method was employed to 1,621 principals and teachers from 416 schools that affiliated to the Office of Basic Education Commission utilizing a multi-stage random sampling technique. Sample size was determined based on Meyers, Gamst, and Guarino's (2006) rules of thumb because Meyers et al. proposed that suitable sample sizes depend upon the numbers of items available for factor analysis. The unit of analysis of this study was school using questionnaire as an instrument.

The interviews were audio recorded and partially transcribed, then coded using a theme analysis approach (Miles & Huberman, 1994). During coding, key themes related to research questions were identified, such as concrete primary factors, secondary factors, and indicators were identified. After the first round of coding, similar themes were grouped into larger categories (Strauss & Corbin, 1990). Exact quotes representing each frequently occurring theme were then fully transcribed based on the audio recordings. To ensure participant anonymity, participants' quotes are identified only by symbol R. The identified factors further discussed and made the final decisions by the five experts or qualified practitioners. The research instrument for the first phase was a semi-structure interview protocol and data was analyzed using content analysis.

At the second phase, researchers utilized the quantitative data and analyzed using SEM in order to fit the model with empirical data. SEM is suitable to use because the theoretical constructs of this research are represented by the latent factor. The relationships between the theoretical constructs are represented by regression or path coefficients between the factors. The SEM implies a structure for the covariance between the observed variables. Confirmatory Factor Analysis (CFA) is used to validate the structural equation model. Secondly, SEM directs around fitting the structural model by measuring the significance of the relationship between latent variables, which is accomplished through path analysis (Kaplan, 2000). CFA was used as a desirable validation stage preliminary to the main use of SEM to identify the causal relations among latent variables (Schumacker & Lomax, 2004)

Findings

Findings of this study are presented according to the research questions as indicated above.

Qualitative findings of primary factors, secondary factors, and indicators of teachers' learning innovation

Qualitative findings from the five experts or qualified practitioners revealed that there are seven primary factors, 26 secondary factors, and 73 indicators included as the multi-level structural equation model. The macro or organizational level variables consisted of educational policy, school leadership, and professional learning community while the micro or individual level variables comprised of self-efficacy, creativity, and achievement motive.

Quantitative findings of identified factors of teachers' learning innovation in a structural relationship model

CFA was used to validate to identify the causal relationships among the latent variables from the first phase. An overview of teachers' learning innovation as indicated in Table 1 below shows that each factor had its loading

value ranging from 0.670 to 0.820 and 0.646 to 0.883 within and between levels respectively at significant level as 0.01. As a result, all the identified factors of teachers' learning innovation are found to be important construct either at micro (individual) or macro (organizational) levels. Table 1 shows the factor loading value and reliability of each factor in the multi-level structural equation model.

Table 1: Factor loading value and reliability of each factor in the multi-level structural equation model

Factors of structural equation model	ICC	Within level				Between level			
		β	SE	t	R ²	β	SE	t	R ²
Innovation novelty	.859	.670	.073	9.164**	.449	.646	.032	20.445**	.417
Innovation value	.883	.730	.057	12.741**	.533	.857	.017	49.237**	.735
Innovation development	.902	.820	.051	16.153**	.672	.883	.016	54.101**	.779
Utilization of innovation	.884	.762	.040	19.076**	.508	.878	.017	51.817**	.770
Policy objectives	.855	-	-	-	-	.840	.018	45.769**	.706
Policy means	.882	-	-	-	-	.963	.010	95.071**	.928
Policy mechanism	.876	-	-	-	-	.855	.019	45.061**	.732
Learning leadership	.873	-	-	-	-	.749	.030	24.872**	.560
Learning-centered leadership	.898	-	-	-	-	.831	.021	40.250**	.690
Constructivist leadership	.882	-	-	-	-	.900	.016	56.382**	.810
Creative leadership	.907	-	-	-	-	.808	.028	29.290**	.653
Shared values and vision	.874	-	-	-	-	.776	.026	30.390**	.602
Exchange practice interpersonal	.880	-	-	-	-	.874	.018	49.063	.764
Support and shared leadership	.873	-	-	-	-	.908	.013	71.983**	.825
Collaborative team	.870	-	-	-	-	.918	.012	74.204**	.842
Expectation towards self-capabilities	.884	.754	.055	13.784**	.569	-	-	-	-
Expectation towards action outcomes	.891	.909	.033	27.808**	.827	-	-	-	-
Initiation	.906	.803	.047	17.126**	.827	-	-	-	-
Flexibility thinking	.897	.757	.061	11.484**	.472	-	-	-	-
Elaborate thinking	.887	.701	.064	11.824**	.857	-	-	-	-
Synthesis	.885	.687	.055	12.575**	.492	-	-	-	-
Perseverance	.879	.708	.068	10.381**	.501	-	-	-	-
Enthusiasm	.885	.799	.053	14.986**	.638	-	-	-	-
Risk taking	.876	.791	.060	13.259**	.626	-	-	-	-
Consistent self-development	.883	.741	.053	14.010**	.549	-	-	-	-
Ambition	.893	.683	.059	11.616**	.467	-	-	-	-

Notes: *p< .05, **p< .01

Table 2 shows that the total effect of factors between level to teachers' learning innovation was 81.4 percent (R² = .814) and within level was 75.9 percent (R² = .759). School leadership had direct and indirectly effect but educational policy and professional learning community only have direct effect to teachers' learning innovation at between level. Additionally, school leadership found to have direct effect to professional learning community and educational policy. On the other hand, creativity had direct effect but self-efficacy had indirect effect to teachers' learning innovation. Only achievement motive had both direct and indirect effects at within level. In addition, self-efficacy and achievement motive has direct effect to creativity of teachers.

Findings from the correlations between the factors of teachers' learning innovation could be evaluated in the standard component score (β) which indicated significantly high and positive correlations at 0.01. On top of that, it was found that the structural equation model has a goodness fit with evident data, with $\chi^2 = 1,023.203$, $df = 568$, $p = .052$, $\chi^2/df = 1.801$, CFI = .953, TLI = .932, RMSEA = .010, SRMRw = .181, and SRMRb = 0.242. Finding shows that the structural relationship model of teachers' learning innovation were consistent with empirical data as shown in Figure 1 and Table 2 below.

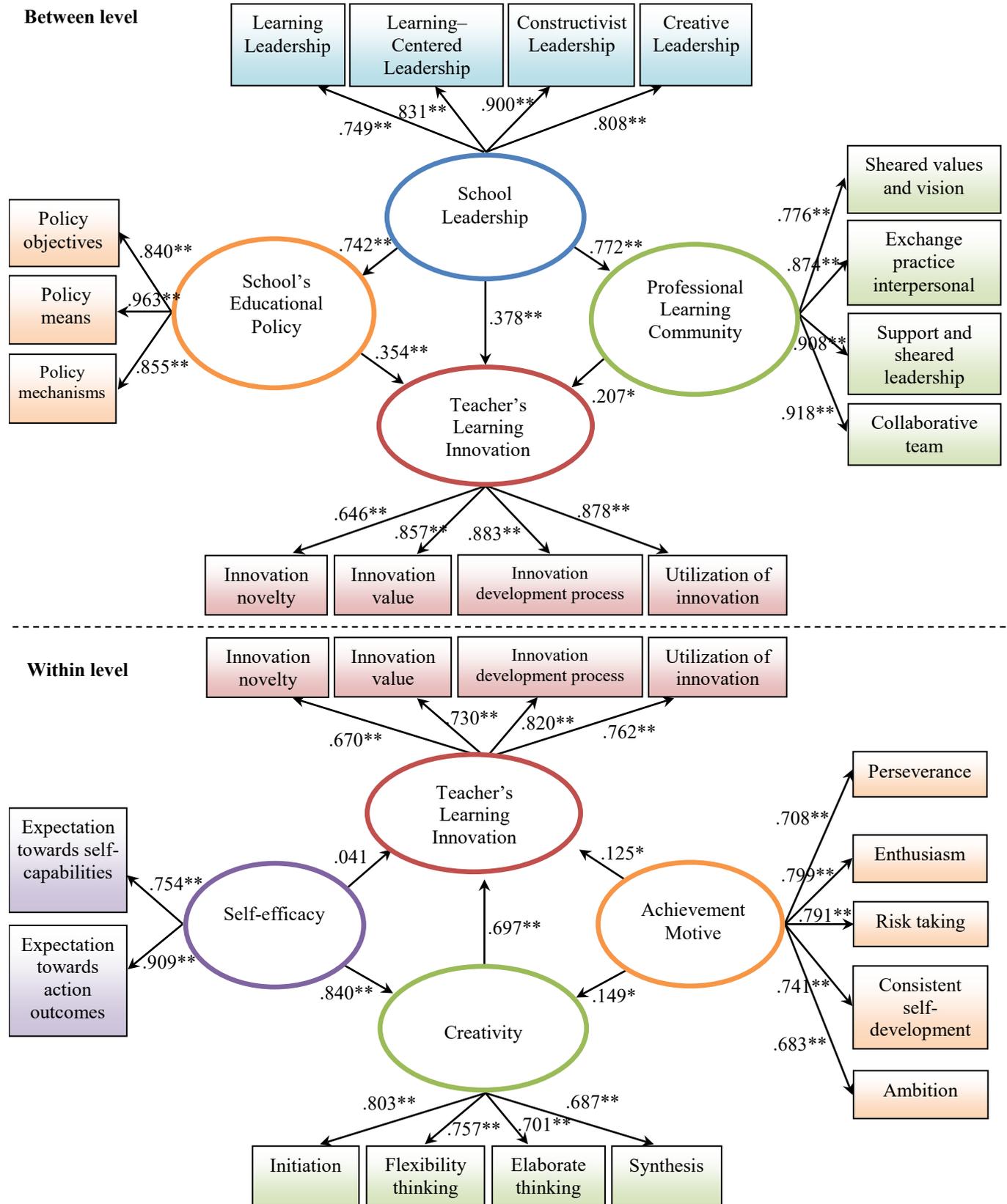


Figure 1: Multi-level structural equation model of teachers' learning innovation

Table 2: Loading values of direct, indirect, and overall influences of latent variables

Effect variables	Teachers' learning innovation			Creativity			Professional learning community			Educational policy		
	DE	IE	TE	DE	IE	TE	DE	IE	TE	DE	IE	TE
Between level												
School leadership	.378**	.160**	.538**	-	-	-	.772**	-	.772**	-	-	-
	.378**	.263**	.641**	-	-	-	-	-	-	.742**	-	.742**
Educational policy	.354**	-	.354**	-	-	-	-	-	-	-	-	-
Professional learning community	.207*	-	.207*	-	-	-	-	-	-	-	-	-
Within level												
Creativity	.697**	-	.697**	-	-	-	-	-	-	-	-	-
Self-efficacy	.041	.585**	.626**	.840**	-	.840**	-	-	-	-	-	-
Achievement motive	.125*	.019*	.144*	.149*	-	.149*	-	-	-	-	-	-
R ² of teachers' learning innovation between level = .814 R ² of teachers' learning innovation within level = .759 $\chi^2 = 1,023.203^*$, $df = 568$, $p = .052$, $\chi^2/df = 1.801$, $CFI = .953$, $TLI = .932$, $RMSEA = .010$, $SRMRw = .181$, and $SRMRb = 0.242$.												

Notes: DE = Direct effect; IE = Indirect effect; TE = Total effect

* $p < .05$; ** $p < .01$

Discussion

This research was designed to provide insight into the multi-level structural equation model of teachers' learning innovation in schools that affiliated to the Office of Basic Education Commission in Thailand. Owing to it is not always possible to deal with single level data structures, researchers have to check the model adequacy as an important step in the model building process through interviewing the five experts or qualified practitioners. The initial phase is made to estimate the factors to fit the multilevel structural equation model (Brown, Mason, Spokane, Cruza-Guet, Lopez, & Szapocznik, 2009).

Teachers' learning innovation in the model includes the values for causal factor analysis, as shown by the high values of factor loading for the six factors. This case has turned into an outcome based on two fundamentals driver, namely macro (organizational) and micro (individual) drivers. The developed multi-level structural equation model fit to the exact empirical data. All empirical data were consistent with the criteria of Diamantopoulos and Siguaw (2000). In addition, these factors were likewise as per the exploration of Songmunuaykun (2005), who utilized the Mplus software for preparing data with all factors as per the predetermined criteria. Be that as it may, they were not in accord with Tochet, Chanpeng, and Meemak (2012), whose χ^2 indicated factual essentialness that was not as per the determined criteria.

All factors in the multi-level structural equation model at both individual and organizational levels could clarify the effect of teachers' learning innovation and portray the teacher individual characteristics such as creativity, self-efficacy, and achievement motive coupling with organizational characteristics such as school leadership, educational policy, and professional learning community. The multi-level structural equation model could be used to describe the relationship of the cause and effect of teachers' learning innovation for both individual and school organizations. This model could be utilized as a means of detailing the underlying model and the results of its creation.

The multi-level structural equation model fit construct validity when considering the causal effect value affecting the teachers' learning innovation, as mentioned above. Alternatively, the empirical data fit with the theoretical model. At the macro level, school leadership affected teachers' learning innovation through educational policy, in which the direct, indirect, and total effects were at .378, .263, and .641, respectively and statistically significant at .01. School leadership also affected teachers' learning innovation through professional learning community, in which the size of direct, indirect, and total effects were at .378, .160, and .538, respectively and statistically significant at .01. This implies that school leadership is the process by which school administrators try to exert their power to gain rapport, respect, and hence have an influence to merge the differences exist among teachers' thought, interest, and want. Thus, the inferiors of teachers will make them willing and enthusiastic to do what the school administrators want. In this respect, teachers' learning innovation is one of the school's target used by the school administrators to motivate, encourage, and support their teachers for creation of innovations in their teaching. The finding is in accordance with Barrett and Breyer's (2014) and Somprach's (2014) findings who found that one of the key roles of school administrators is to encourage the creation of classroom innovations.

Educational policy affected teachers' learning innovation with the direct effect of .354 and statistically significant at .01. This implies that educational policy is a tool the school administrators use to set the direction and goal

towards success. It is the guidelines for establishing implementation means from the current situation towards the future including the school plans that will lead to emergence of teachers' learning innovations. This finding is in line with Lertnaisat and Charoensuk (2014) who highlighted that educational policy is the factor that supports potential and innovation development. Professional learning community affected teachers learning innovation with the direct effect as .207 and statistically significant at .05. This finding is supported by previous researchers such as Giles and Hargreaves (2006) and also Somprach et al. (2017) who emphasized that professional learning community model can lead to a greater strength of the school's general activities and innovations.

At the micro level, creativity found to be successfully affected teachers' learning innovation with the direct effect as .697 and statistically significant at .01. This implies that creativity is the ability that enables teachers to see the relationships among various conditions thus stimulates their ideas and thinking. This finding is correlated to Naz and Murad's (2017) finding. Naz and Murad believed that individual creativity is an important element behind innovation creation for the success of an organization. In addition, Chimthongdee and Kaemkate (2015) who conducted a causal model of teachers' ability to create innovation also found that creativity had direct effect on teachers' ability to create innovation.

Self-efficacy was found to affect teachers' learning innovation with the direct, indirect, and total effects as .041, .585, and .626, respectively and statistically significant at .01. This implies that self-efficacy enables teachers to work efficiently and influences their creation of learning innovations. Hsiao et al. (2011) stated that self-efficacy is related to creative problem-solving and innovation construction, and self-efficacy has positive correlation with innovation creating. Achievement motive was found to be significant factor in the model with direct, indirect, and total effects as .125, .019, and .144, respectively and at statistically significant at .05. This implies that achievement motive is teachers' expression that demonstrates their wants and needs for success and has positive impact on the creation of learning innovation. This finding is agreed by past researchers such as Chimthongdee and Kaemkate (2015) and Zennouche (2014).

Finally, researchers would like to suggest to Thailand Ministry of Education to conduct training which incorporating all the factors that affecting teachers' learning innovation. Our findings suggest that human resource department at the Ministry of Education needs to recruit school administrators who have potential for promote professional learning communities as a means to facilitate teacher individual characteristics such as creativity, self-efficacy, and achievement motive in order to encourage teachers' learning innovation. Other practical consideration may involve the facilitation of an increasing understanding and appreciation of research evidence to help basic education school administrators specifically and teachers generally on how to develop innovative abilities and promote maximum innovative performance in their teaching.

References

- Ariratana, W., Sirisooksilp, S., & Tang, K. N. (2016). The effect of leadership styles on professional learning community. *New Trends and Issues Proceedings on Humanities and Social Sciences*, 8, 60-69.
- Bae, C. L., Hayes, K. N., Seitz, J., O'Connor, D., & DiStefano, D. (2016). A coding tool for examining the substance of teacher professional learning and change with example cases from middle school science lesson study. *Teaching and Teacher Education*, 60, 164-178.
- Bakkenes, I., Vermunt, J. D., & Wubbels, T. (2010). Teacher learning in the context of educational innovation: Learning activities and learning outcomes of experienced teachers. *Learning and Instruction*, 20, 533-548.
- Barrett, C. & Breyer, R. (2014). The influence of effective leadership on teaching and learning. *Journal of Research Initiatives*, 1(2). Retrieved from <http://digitalcommons.uncfsu.edu/jri/>
- Bernard, H.R. (2002). *Research methods in anthropology: Qualitative and quantitative approaches* (3rd ed.). Walnut Creek, CA: Alta Mira Press.
- Brown, S. C., Mason, C. A., Spokane, A. R., Cruza-Guetttt, M. C., Lopez, B., & Szapoczink, J. (2009). The relationship of neighborhood climate to perceived social support and mental health in order Hispanic immigrants in Miami, FL. *Journal of Aging and Health*, 21, 431-459.
- Cachia, R., Ferrari, A., Ala-Mutka, K., & Punie, Y. (2010). Creative learning and innovative teaching. *Final report on the study on creativity and innovation in education in the EU member states*. European Commission: Institute for Perspective Technological Studies.
- Cheng, X. & Wu, L. Y. (2016). The affordances of teacher professional learning communities: A case study of a Chinese secondary school. *Teaching and Teacher Education*, 58, 54-67.
- Chimthongdee, W. & Kaemkate, W. (2015). A causal model of teacher's innovative ability with creative thinking as mediator. *OJED*, 10(1), 1-9.
- Creswell, J. W. (2014). *Research design qualitative, quantitative and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.

- Cresswell, J.W., & Plano Clark, V.L. (2011). *Designing and conducting mixed method research* (2nd ed.). Thousand Oaks, CA: SAGE.
- Diamantopoulos, A. & Siguaw, A. D. (2000). *Introducing LISREL: A guide for the uninitiated*. London, UK: SAGE.
- Giles, C. & Hargreaves, A. (2006). The sustainability of innovative schools as learning organizations and professional learning communities during standardized reform. *Educational Administration Quarterly*, 42(1), 124-156.
- Hsiao, H. C., Chang, J. C., Tu, Y. L., & Chen, S. C. (2011). The influence of teachers' self-efficacy on innovative work behavior. *2011 International Conference on Social Science and Humanity IPEDR 5*. Singapore: IACSIT Press.
- Cho, J. & Huh, J. (2017). New education policies and practices in South Korea. UNESCO Bangkok: Asia and Pacific Regional Bureau for Education. Retrieved from <https://bangkok.unesco.org/index.php/content/new-education-policies-and-practices-south-korea>
- Kaplan, D. (2000). *Structural equation modeling: Foundations and extensions*. Thousand Oaks, CA: Sage Publications.
- Könings, K. D., Brand-Gruwel, S., & van Merriënboer, J. J. G. (2006). Teachers' perspectives on innovations: Implications for educational design. *Teaching and Teacher Education*. doi: 10.1016/j.tate.2006.06.004.
- Lertnaisat, R. & Charoensuk, A. (2014). An analysis of factors affecting the potential development and innovation of Thailand industrial sectors. Bangkok, Thailand: Faculty of Business Administration Thai-Japan Institute of Technology.
- Meyers, L. S., Gamst, G., & Guarino, A. J. (2006). *Applied multivariate research: Design and interpretation* (2nd ed.). Thousand Oak, CA: SAGE
- Miles, M.B., & Huberman, A.M. (1994). *Qualitative data analysis: An expanded sourcebook* (2nd ed.). Thousand Oaks, CA: SAGE.
- Morgan, P. L., Farkas, G., Hillemeier, M. M., & Maczuga, S. (2016). Science achievement gaps begin very early persist, and are largely explained by modifiable factors. *Educational Researchers*, 45(1), 18-35.
- Naz, F. & Murad, H. S. (2017). Innovative teaching has a positive impact on the performance of diverse students. *SAGE Open, October to December*, 1-8.
- Owen, S. M. (2015). Teacher professional learning communities in innovative context: 'Ah hah moments', 'passion' and 'making a difference' for student learning. *Professional Development Education*, 41(1), 57-74.
- Paniagua, A. (2018). Innovation in everyday teaching: No more waiting for superman. Education Plus Development. Retrieved from <https://www.brookings.edu/blog/education-plus-development/2018/02/08/innovation-in-everyday-teaching-no-more-waiting-for-superman>.
- Patton, M.Q. (2002). *Qualitative research and evaluation methods* (3rd ed.). Thousand Oaks, CA: SAGE.
- Schumacker, R., & Lomax, R. (2004). *A Beginner's Guide to Structural Equation Modeling* (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Somprach, K. (2014). *School leadership and self-development for school administrators*. Khon Kaen, Thailand: Faculty of Education, Khon Kaen University.
- Somprach, K., Tang, K. N., & Popoonsak, P. (2017). The relationship between school leadership and professional learning communities in Thai basic education schools. *Educational Research Policy and Practice*, 16, 157-175. doi: 10.1007/s10671-016-9206-7.
- Songumnuaykun, S. (2005). *Effects of entrepreneurship on the intellectual contributions, and services of university departments: An application of non-recursive, multi-level structural equation model*. (Unpublished doctoral dissertation). Bangkok, Thailand: Thailand Development Research Institute.
- Strauss, A., & Corbin, J. (1990). *Basics of qualitative research*. Thousand Oaks, CA: SAGE.
- Teichler, U. (2004). The changing debate on internationalization of higher education. *Higher Education*, 48, 5-26.
- Tochot, P., Chanpeng, P., & Meemak, P. (2012). The multilevel causal factors affecting the evaluation utilization. *Journal of Education Khon Kaen University*, 35(2), 48-60.
- Zennouche, M. (2014). Factors influencing innovation at individual, group and organizational levels: A content analysis. *International Journal of Information Systems and Change Management*, 7(1), 23-42.

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Nat And His Friends: A Learning Support In Mathematics Education

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Abstract

We describe a path which came into being after it was noted that Italian primary school children (aged 6-11 years) have difficulty in understanding the necessity for using different numerical sets depending on the problem they are dealing with. We decided to use a mostly visual support which would be simple, engaging and able to evolve over time. Thus, the poster “Nat and his friends” was born, where the characters appear, for the first time, in the moment in which a problem requires it in the five years of Italian primary school. Besides “Nat” (the set of natural numbers), “Ra” (the set of rational numbers), “Rel” (the set of relative numbers), other characters were necessary, that is, “Al”, “Geo”, “Misu”, “Alea”. “Geo” and “Alea” represent two areas, respectively that of geometry and that of mathematics of uncertainty; “Al” is the “depository” of procedures, while “Misu” steps in when there are problems of measurement. Lastly, there is “Logic the Traveller”. This character, given that she is a “traveller”, is not on the poster; she is mostly used when dealing with problems of classification.

1. Introduction

At Italian primary school level (5 years: from first to fifth year, with children aged 6-11 years), mathematics aims to provide tools to investigate and explain many of the phenomena of the world which surround us, favouring a rational approach to the problems that reality sets (see MIUR, 2018; see also Canetta, Manara & Marchi, 1986, and Angeli, D’Amore, Di Nunzio & Fascinelli, 2011). This happens for the natural number, in both cardinal and ordinal aspects: The first aspect stems from the spontaneous and “natural” operation of counting and translates, first via concepts and then symbols, the relationship of equipotency between finite sets of concrete objects; the second aspect may be reached through elementary operations of comparison between sets of different cardinality or using “natural” intuition in linear ordering or alignment. The first moment of construction of the natural number is therefore that of carrying out a comparison between finite sets which leads to the construction of an abstract concept.

The aim of primary school is to widen the learners’ fields of interest and, as a consequence, there are more and more things to learn about the world outside: Thus, from handling concrete sets which have a finite number of elements, requiring the use of natural numbers, we arrive at the presentation of problems with solutions in other numerical sets. Therefore, the foundations are created for the necessity for new cognitive and expressive “worlds”, which will be the subject for study after primary school.

Obviously, difficulty in comprehension and, correspondingly, didactic difficulty increase. It should be said that the difficulties encountered by the learners, in their experiences with numbers, are the same as those of human beings through the centuries, in the historical evolution of the concept of the number, as the various numerical systems were introduced in response to differing questions regarding means to control certain situations. If the subject of natural numbers seems to be managed (quite) well, difficulties arise with handling and understanding the significance of rational numbers (and their representations) and continue to increase when, at secondary school level, real numbers, not to mention complex numbers, are dealt with.

2. The Research Project

The project illustrated here was born in the context of our research group (“Nucleo di Ricerca in Didattica della matematica”, Department of Mathematics and Earth Science, University of Trieste, Italy), comprising a mixed group of teachers from nursery, primary, middle and high school level (who teach children and young people between 3 and 19 years old), led by university teachers involved in many activities to promote and improve mathematics teaching at the various school levels. In the course of the periodical group meetings, difficulties, gaps, and misconceptions are highlighted and together we try to find strategies and approaches of “prevention” and “solution”. Our activity is also “outward-looking” whereby we organize events to promote mathematics for children and young people and initial training or refresher courses for teachers; among these activities we should

remember “La matematica dei ragazzi”, which has been held every two years since 1996 this year being the twelfth time (see Leder, Scheriani & Zuccheri, 2002, and Zuccheri & Zudini, 2014).

The idea for the present research came from the observation over a period of years by one of the authors of this paper (a primary school teacher since 1996 in Trieste) that primary school children experience great difficulty in recognizing that an entity belongs to a certain numerical set (in particular, distinguishing between natural and rational numbers) or other mathematical fields (for example, geometry, measurement, ...).

In the specific context of our project, we believe that the research experience presented here has importance both for preventing the formation of misconceptions and for limiting the difficulties encountered by the children. According to the project, the experience would be expected to start right in the first year of primary school and to run throughout the whole period of primary school, ending in the fifth year.

With regard to the present state of the research, begun in the first year of the Primary School “G. Foschiatti” of Trieste (15 pupils) in 2015, we are now at the end of the third year (June 2018).

3. “Nat And His Friends”

3.1 The Birth Of The Poster

Previous experience of one of the authors of this paper (over a period of more than 15 years) demonstrates that the use, right from the first year of primary school, of a poster which shows a picture of nine children, the “Children of Mother Grammar”, allows all pupils, even the ones who have some difficulty, to recognize the nine parts of speech of Italian grammar.

The drawing (see Figure 1) is based on the fact that every child-character, who represents a part of speech (noun, article, verb, adjective, adverb, preposition, pronoun, exclamation, and conjunction), has his/her own colour and “is doing” something related to his/her grammatical function. For example, “Article” (drawn slightly smaller than “Noun”) holds hands with “Noun”, who, in turn, holds hands with “Adjective”: In Italian grammar, these agree, or “get on with each other”.



Figure 1. The poster “Mother Grammar” (Figure and photo by D. Leder)

If the methodology works for learning Italian grammar, why not then use the same sort of visual aid (poster) for mathematics and try creating a poster with characters relating to it?

3.2 Characters Of The Poster

In the first year of the Primary School “G. Foschiatti of Trieste, the following characters were born in 2015 (listed in order of appearance), each of whom are depicted as a boy/girl, identified with a colour and the characteristics accessible to the pupils at the present state of the research (that is, at the end of the third year, June 2018):

1. “Nat” (coloured blue), representing natural numbers; in line with his prerogative, he does not write anything and counts pointing (cardinal and ordinal aspects of the natural number) (see Figure 2).



Figure 2. “Nat” (Figure and photo by D. Leder)

2. “Al” (coloured white, perhaps because he is acknowledged as “cutting across” various fields), representing the writing of numbers; Nat’s precise and fussy brother, in line with his prerogative, he puts everything in order and records by writing down (he compares, orders, writes, and enables the consultation of the algorithms of operations) (see Figure 3). The children, for the time being, have understood more the operative aspect rather than that of the writing.



Figure 3. “Al” (Figure and photo by D. Leder)

3. “Ra” (coloured red), representing rational numbers; in line with her prerogative, she shares out a bar of chocolate (see Figure 4). “Ra” has appeared a little earlier than usual in the school syllabus but in this way the learners arrive, with greater familiarity, at decimal numbers and fractions.



Figure 4. “Ra” (Figure and photo by D. Leder)

4. “Misu” (coloured green), representing measurement. In line with his prerogative, he compares two equal baskets which contain quantities of fruit to decide if they are equal or, if not, which one is lesser or greater

than the other (see Figure 5); when he has decided, he might need “Nat” and then, if “Nat” cannot help him, he calls “Ra”.



Figure 5. “Misu” (Figure and photo by D. Leder)

5. “Geo” (coloured brown), representing geometry; in line with her prerogative, she traces paths and identifies the shapes of the fruit and leaves and dreams about an ice cream and a witch’s hat (in order to have solid figures, such as cones and cylinders, represented also in other contexts) (see Figure 6). “Nat” and “Ra” are very friendly and close with her, even if she often has to ask for help also from “Al” (for example, for calculating a perimeter).



Figure 6. “Geo” (Figure and photo by D. Leder)

All these characters are drawn in a wood, on the poster of “Nat and his friends” (see Figure 7)



Figure 7. The poster “Nat and his friends” (Figure and photo by D. Leder)

Starting from the first year, whenever there is a need or a necessity, these child-characters are “called”. For example, if I have a cake and I want to divide it up into 6 equal parts, who shall I call? Surely “Nat”! And also “Al” and maybe even “Ra”.

Further characters have been added:

6. In the third year (this year), Mrs. “Logic” has appeared; she is a traveller. She is the twin sister of the “Logic” used in Italian and is multi-coloured, like a rainbow (as she is recognized as “cutting across” various fields and therefore not part of the poster) (see Figure 8). The choice of her name is due to her interventions with “and”, “or”, “not”, while remaining clear that she is to be distinguished from her twin sister who intervenes in Italian.



Figure 8. “Logic the Traveller” (Figure and photo by D. Leder)

7. At the end of the third year, also “Alea” (“die” in Latin) has appeared as an objective necessity for the problematic situation to be solved, representing probability and statistics; in fact, she plays with dice. “Alea” does not have a colour, but her clothes have the same markings as a die (see Figure 9). She is not yet on the poster, but she will appear at the beginning of the fourth year (September 2018).



Figure 9. “Alea” (Figure and photo by D. Leder)

8. Instead, “Rel” has shyly appeared in the third year, representing relative numbers; he wears red and black clothes and has in his hand a notebook and a pen to record losses and gains (see Figure 10). He has been informally introduced because the children became curious about “numbers with minus in front”, mentioned by adults during some very cold days, therefore linked to measuring temperature in degrees Celsius. This provided an opportunity to explain that the numbers on the thermometer and the numbers represented by “Rel” are two different things. “Rel” has shyly appeared because it was not yet the right moment to introduce him mathematically and it has not yet been explained why he is dressed as he is, nor why he is holding that notebook...that will be for future discussion... for the moment we have only ruled out that he is a Milan football fan (whose players and fans are identified by the colours red and black). We can disclose that the colours red and black relate to the method of accounting (red is used for outgoings and black for incomings).



Figure 10. “Rel” (Figure and photo by D. Leder)

It should be made clear that the names of the characters make way for the “real” names which the learners will encounter (formally) later on, at middle and high school (for example, “Nat” leads to “natural numbers”, “Ra” to “rational numbers”).

4. First Assessment Of The Poster As A Teaching Support

It is still early to make an objective assessment inasmuch as we are at the end of the third year, only a little over halfway through the experimental period. The children have had time to get to know the characters better and better as they themselves consolidated their knowledge in the field of mathematics.

The fact that they could discuss together in class has allowed for possible doubts to come out and then new stimuli to introduce or develop the subject (see Pontecorvo, Ajello & Zucchermaglio, 1999). To give an example, we have discussed who we should “call” when meeting an apparent fraction: “Ra” or “Nat”? Or again, for zero...is “Nat” alright or “Ra”, or both? Or, furthermore, can “Al” stand alone?

Certainly, the children have been very taken by these characters, so much so that at the end of the third year (June 2018), of their own volition, they performed a short show for the parents, playing the parts of the characters and showing how they “function”, i.e. setting problematic situations which the parents had to solve “calling” the correct (appropriate) characters. It was a useful experience where everybody, even the pupils who have difficulty, took active part.

4.1 Recognition Of The Character Required By The Situation

At the end of the third year, first specific tests were held to ascertain if the children were able to link correctly the character/s with the context provided, showing awareness of the problematic situation that they were dealing with. There were two types of test: In the first type (“PROVA 1”) the children were presented with numbers, operations, and measurements which they had to circle, using the colours of the characters and thus showing that they recognized by colour the character/s which needed to be “called” (graphic test); in the second type of test (“PROVA 2”), which dealt with problematic situations (in the form of a text), the pupils were required to choose the characters (more than one) to “call” putting an “X” on the characters which were written beside.

If, during the curricular lessons, there was always someone in the group who verbally found the right correspondence, in the written tests, in the situations where the pupils just have to call a single character (it does not matter whether it is “Nat” or “Ra”, given that “Al” cannot stand alone, and “Misu” and “Geo” rarely appear alone), 98% of the children identify “Nat”, while 87% identify “Ra”.

Clearly, a problematic situation which requires the consideration of more than one aspect at the same time (i.e. calling more than one character) can be more difficult for 8-year-old children (as is seen from the results obtained regarding, for example, “Nat” and “Ra”: only 84% of the children recognize “Nat” and 53% “Ra”). The ability to take into account simultaneously various aspects is, after all, a skill which should be fostered in relation to the pupils’ cognitive development; we can work towards this to help acquire a greater awareness of the difficulties of the problematic situations and to develop a positive attitude towards it (without fear).

4.2 Future Developments In Research

We have seen how the characters and their personalities have evolved since the beginning of the research, acquiring over time features and prerogatives as the children, bit by bit, encountered increasingly complex problematic situations.

This will presumably also happen as the research continues (starting up again in September 2018, with the beginning of the fourth year, and continuing until the end of the fifth year), where we might reasonably suppose that the characters will be better defined and discussed in their peculiarities in relation to new learning situations. It will be useful to evaluate step by step, through suitably-prepared tests, the competencies which the pupils develop in recognizing that an entity belongs to a certain numerical set or to other mathematical fields. After modifying their text accordingly, the same tests may be given, with the cooperation of teachers who are part of our research group, also to learners in schools of higher level, in order to check the correspondence with our results.

References

- Angeli, A., D'Amore, B., Di Nunzio, M., & Fascinelli, E. (2011). *La matematica dalla scuola dell'infanzia alla scuola primaria*. Bologna: Pitagora.
- Canetta, P., Manara, C. F., & Marchi, M. (Eds.) (1986). *Per un curriculum continuo di educazione matematica nella scuola dell'obbligo*. Quaderni IRRSAE, 13.
- Leder, D., Scheriani, C., & Zuccheri, L. (2002). "La matematica dei ragazzi: scambi di esperienze tra coetanei". Una valutazione del lavoro svolto. In L. Zuccheri, D. Leder, & C. Scheriani (Eds.), *La matematica dei ragazzi: scambi di esperienze tra coetanei*. Antologia delle edizioni 1996-1998 (pp. 167-179). Trieste: EUT.
- MIUR (2018). *Indicazioni nazionali e nuovi scenari*. Documento a cura del Comitato Scientifico Nazionale per le Indicazioni Nazionali per il curriculum della scuola dell'infanzia e del primo ciclo di istruzione (<http://www.miur.gov.it/documents/20182/0/Indicazioni+nazionali+e+nuovi+scenari/3234ab16-1f1d-4f34-99a3-319d892a40f2>).
- Pontecorvo, C., Ajello, A. M., & Zucchermaglio, C. (1999). *Discutendo si impara*. Roma: Carocci.
- Zuccheri, L., & Zudini, V. (2014). *Io e la matematica. Un'indagine sul rapporto dei ragazzi con la matematica*. In L. Zuccheri, M. Stoppa, & V. Zudini (Eds.), *La matematica dei ragazzi: scambi di esperienze tra coetanei*. Edizione 2010 (pp. 155-184). Trieste: EUT.

Need Assessment For The Supervision Model To Enhance Critical Thinking For Science Teachers In Expansion Schools

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Abstract

This research was aimed to investigate the current and desirable supervision conditions and thus develop a draft model that enhancing critical thinking of science teachers in expansion schools. This is followed by evaluating the developed draft model. A total of 384 science teachers were selected as respondents using a multi-stage random sampling technique. Researchers employed a quantitative survey design. This research utilized two types of instruments namely questionnaire and evaluation form. Descriptive statistics such as percentage, mean score, and standard deviation and also the formula Modified Priority Needs Index were used to analyze the data. Findings of this research revealed that the current supervision condition to enhance critical thinking is at moderate level whereas the desirable supervision condition is at highest level. Subsequently, finding of the development model needs for supervision demonstrated in descending order as follows: (i) principles of supervision; (ii) work evaluation and improvement, and (iii) knowledge distribution and learning methods. Finally, the developed draft model ATOMS to enhance critical thinking was comprised of five factors namely assessment of context, teaching and learning methods, objectives, mentoring and coaching, and summative evaluation and improvement.

Keywords: *Coaching; critical thinking; primary school; supervision model*

Introduction

In recent years, there has been a shift in many countries including Thailand in their national educational curriculum policy statements from an emphasis on knowledge to an emphasis on higher order thinking skills (Fung, Townsend, & Parr, 2004). In Thailand, critical thinking is considered to be an important educational goal at all levels of schooling. However, there appears to be little agreement about the importance of increasing critical thinking ability, there appears to be little agreement in what is it, how critical thinking should be done, and how to facilitate students. In general, the major difficulty in educating for critical thinking is lack of a synthesized understanding about what is meant by the term, and what an effective critical thinking supervision model to enhance critical thinking for science teachers in particular becomes urgency to investigate.

The foundation for critical thinking (n.d.) clarified the importance of evaluating instruction for critical thinking is to improve students' abilities to think their way through content, using disciplined skill in reasoning. Critical thinking issues such as how to define critical thinking, how to teach critical thinking, and whether critical thinking should be taught or learned through social interaction plague science teachers who think about enhancing the critical thinking skills of their students (Choy & Cheah, 2009). Tang (2018) defined critical thinking as a skill that is taught at school and university but its main purpose is to better equip the students to understand the world, to make more sense of the vast amount of information that is available to us and to avoid, being manipulated. This is further supported by Prasertcharoensuk, Tang, and Tuksino (2017) as life skill.

Critical thinking, in a broad sense, is the thinking that alerts and guides science teachers to examine the quality of their thinking as well as that of others so that science teachers become more certain of whether they are making a good choice of what to believe and do. In a strict sense, when science teachers engage in critical thinking they want to put themselves in a position to distinguish good thinking from faulty thinking, and also in a position to identify what has made it good or faulty. Through critical thinking science teachers want to enhance our thinking ability so that they can respond to problems and opportunities in ways that facilitate individual and collective well being and growth.

Thailand 4.0 model is currently promoted by current Thai government to lead the country to its innovation economy stage, with the aim to elevate potentially to be a wealthy and secure developed nation of the first world in the context of a 4th phase economic revolution (Chantarasiri, 2017). Sungchai (2009) emphasized that school administrators have to emphasize the learning processes that enabling the development of critical thinking, problem-based learning, and knowledge implementation skills for real life situation in accordance with the

National Education Act of Thailand. This is further highlighted by Nillapun (2011) stated that the concept of 21st century skills including two main skills namely critical thinking and problem-solving as well as creative and innovative skills. These skills are vital for students to be independent learning with a high level of critical thinking when comprehending information.

Research Objectives

The main aim of this research was to investigate the supervision model seeking to enhance critical thinking for science teachers in expansion schools, Thailand. To achieve this aim the following specific objectives were formulated to guide the research:

- i. To investigate the current and desirable conditions of supervision to enhance critical thinking for science teachers in expansion schools.
- ii. To evaluate the developed draft supervision model to enhance critical thinking for science teachers in expansion schools.

Method

Researchers employed survey questionnaire as a method to collect quantitative method. A total of 7,063 Grade 7 science teachers who are working in expansion schools under the administration of Primary Educational Service Areas, Office of the Basic Education Commission were the population of this research. The required sample size was 364 samples according to Krejcie and Morgan's Table at 95 percent confident level using multi-stage random sampling technique.

The research instruments used were a questionnaire and an evaluation form. Both instruments were administered in Thai language to ensure that the respondents were clear about the statements. The questionnaire was constructed to enquire on current and desirable conditions of supervision that enhancing critical thinking. Furthermore, respondents' responses towards the needs of the supervision model to enhance critical thinking, a five-point Likert scale was utilized, ranged from most, much, moderate, less, and least.

Other than the survey questions in the form of questionnaire, an evaluation form was used to measure the suitability of the developed draft supervision model by the nine experts. This methods benefits this study in terms of obtaining data more efficiently as time, energy and costs could be minimized (Sekaran 2006), provides an excellent means of measuring attitudes and orientations in a large population which can, therefore, be generalized to a larger population (Babbie 2002).

According to Chueachot, Srisa-ard and Srihamongkol's (2013) interpretation of opinions toward current and desirable conditions of supervision that seeking to enhance critical thinking were analyzed using the formula of Modified Priority Needs Index (PNI_{Modified}). As a result, researchers determined its level as shown in Table 1. Data was analyzed using descriptive statistics include percentage, mean score, and standard deviation. This is followed by the analysis and priorities the needs for supervision seeking to enhance critical thinking for science teachers in expansion schools were prioritized (The Institute for Promotion of Teaching Science, Mathematics, and Technology, 2014).

Table 1: Interpretation of mean range

Mean range	Interpretation
1.00 – 1.50	The least level of comments
1.51 – 2.50	The less level of comments
2.51 – 3.50	The moderate level of comments
3.51 – 4.50	The much level of comments
4.51 – 5.00	The most level of comments

Results

The initial result is the descriptive results related to the characteristics or backgrounds of the respondents that derived from the Section 1 of the questionnaire. This is followed by results about the current and desirable conditions of supervision seeking to enhance critical thinking for science teachers in expansion schools. Next, the needs required conditions as well as the PNI reading on development supervision model are presented. Finally, an evaluation was conducted on the developed ATOMS model.

Descriptive results

Majority of the respondents (67.9%) are female, 40.19 percent of them aged between 36 to 45 years old. On top of that, all the respondents are holding the position as specialized teachers. A total of 50.09 percent of the respondents obtained a master's degree or higher academic qualification and 68.54 percent of them have

experience related to critical thinking training or have been trained in any program related to critical thinking (38.63%).

Results about current and desirable conditions of supervision

Results of respondents’ opinions on current and desirable conditions of supervision seeking to enhance critical thinking for science teachers were categorized into two groups: (i) Current and desirable conditions of supervision seeking to enhance critical thinking; (ii) Current and desirable conditions of science teachers’ abilities and behaviors related to critical thinking, as shown in Table 2.

Table 2: Current and desirable conditions of supervision

Supervision to enhance critical thinking	Current			Desirable			Needs index	Level of need index
	Mean	SD	Interpret	Mean	SD	Interpret		
Factors of supervision model to enhance critical thinking								
Principles of supervision	2.88	0.57	Moderate	4.60	0.42	Highest	0.60	1
Purpose	2.96	0.62	Moderate	4.71	0.42	Highest	0.54	4
Process:	2.64	0.58	Moderate	3.11	0.58	Moderate	0.17	8
Assessment of context								
Process: Teaching and learning methods	3.08	0.67	Moderate	4.68	0.38	Highest	0.52	5
Process: Objectives	2.99	0.69	Moderate	4.65	0.41	Highest	0.55	5
Process: Mentoring and coaching	3.09	0.56	Moderate	4.71	0.36	Highest	0.52	5
Process: Summative evaluation and improvement	3.01	0.63	Moderate	4.71	0.42	Highest	0.56	2
Use factors	3.21	0.58	Moderate	4.76	0.36	Highest	0.48	7
Total	3.00	0.58	Moderate	4.61	0.41	Highest		
Conditions of science teachers’ abilities and behaviors related to critical thinking								
Learning management for enhancing critical thinking	3.24	0.50	Moderate	4.76	0.39	Highest	0.47	2
Behaviors related to critical thinking	3.36	0.56	Moderate	4.82	0.38	Highest	0.35	1
Total	3.33	0.58	Moderate	4.79	0.38	Highest		

Table 2 shows that the overall current condition of supervision to enhance critical thinking was at moderate level while the overall desirable condition of supervision to enhance critical thinking was at highest level for science teachers in expansion schools in Thailand. The needs for supervision to enhance critical thinking for science teachers in expansion schools, prioritized from highest to lowest in descending order are supervision principles, evaluation and improvement, and knowledge distribution and learning methods.

Results Of The Development Of A Supervision Model

Based on the findings above, researchers drafted a supervision model seeking to enhance critical thinking for science teachers. The drafted supervision model was then evaluated by nine experts. Findings from the nine experts’ evaluation illustrated that the overall suitability of the supervision model is at the highest level ($\bar{x} = 4.78$; $SD = 0.18$). Specifically, findings indicated that the preparation, improvement while working, and post improvement evaluations were at the highest level as mean score 4.56, 4.81, and 4.68 respectively. However, the nine experts evaluated training as high level with a mean score as 4.50.

In addition, the nine experts suggested three additional concepts which could inform factors of supervision seeking to enhance critical thinking for science teachers in expansion schools, as follows:

- Current condition evaluation
- Relationship promotion
- Principles of supervision
 - Principles
 - Objectives
 - Supervision process
 - Assessment of context
 - Teaching and learning methods
 - Observations
 - Pre-observation conference
 - Event
 - Reflection
- Mentoring and coaching
- Summative evaluation and improvements

Development of ATOMS supervision model

The end product of this research was the development of ATOMS supervision model seeking to enhance critical thinking for science teachers. ATOMS is a concept of supervision that implies supervision should cover the content thoroughly and the roles of supervisor and science teacher should be clearly separated in every step of the teaching process. Researchers utilized a career developmental process or mentoring and coaching. The time shared between the supervisor and science teachers during supervision was significant as well as their friendly and close relationship played more than a coaching role itself. The principle of coaching was to give no direction, instructions or answers. If an answer was to be told in the context of two answers. A particular thinking process occurred in the supervisor’s mind as a result of mentoring and coaching.



Figure 1: ATOMS Supervision Model

Discussion And Conclusion

The priority needs for supervision in descending order are principles of supervision, evaluation and improvement, and ability to manage the class to enhance critical thinking skills for science teachers. The findings show that overall and sub-items relating to the current condition of supervision seeking to enhance critical thinking are at moderate level but the desirable condition of supervision seeking to enhance critical thinking for science teachers are at highest level. On the other hand, the needs for learning management abilities in descending order are activities that allow students to identify the factors of a situation, to relate the problem to the information in order to choose the most relevant information, and to reflect on their opinions by recording them for examination and review in order to integrate them after the lesson. Moreover, findings of science teachers’ critical thinking abilities showed that science teachers demonstrated open-mindedness and then logic in descending order. All the above findings are consistent with Buachoon, Yutakorn and Suwanruji’s (2015) study, this implies that teachers’ critical thinking development was found to be inconsistent and lacked of evaluation. Additionally, findings of this research also correlate with Iamsamang’s study (2012) that investigated commercial college teachers’ critical thinking

dispositions in Thailand.

Findings relating to ATOMS model consisted of five main factors, namely assessment of context (A), teaching and learning methods (T), observation (O), mentoring and coaching (M), and summative evaluation and improvement (S). This supervision model is correspond to Sungchai (2009) and Chuenklin (2010). Researchers would like to suggest to Educational Service Area Offices and expansion schools to implement a systematic development for science teachers that focusing on developing the principles of supervision, work evaluation and improvement, and knowledge distribution and learning methods in order to promote sustainable learning organizations. Finally, implication of this research is encouraging the policy level agencies to focus on supervision through managing a motivation system for supervisors, school administrators, and senior science teachers who can conduct effective supervision.

Research and development should be conducted using the factors obtained from this research. The obtained factors can be used as concrete criteria when carrying out supervision of science teaching. Researchers would like to recommend to future researchers to conduct a strategic supervision, especially to enhance critical thinking or advanced thinking level using monitoring and coaching. This will support the offensive development approach for supervisors throughout Thailand.

References

- Babbie, E. (2002). *The basic of social research* (2nd ed.). USA: Thomson Learning, Inc.
- Buachoon, N., Yutakorn, N., & Suwanruji, P. (2016). The study of the state teaching and learning of science for quality of life in general education. *VRU Research and Development Journal Humanities and Social Science*, 11(2), 98-109.
- Chantarasira, P. (2017). *Policy and strategic planning for the new era*. Maha Sarakham, Thailand: Apichart Printing.
- Choy, S. & Cheah, P. (2009). Teacher perceptions of critical thinking among students and its influence on higher education. *International Journal of Teaching and Learning in Higher Education*, 20(2), 198-206.
- Chueachot, S., Srisa-ard, B., & Srihamongkol, Y. (2013). The development of an assessment for learning model for elementary classroom. *International Education Studies*, 6(9), 119-124.
- Chuenklin, T. (2010). The development of coaching model to enhance nursing instructors' competency that promotes critical thinking skills of nursing students in Praboromarachanok Institute, Ministry of Public Health. Unpublished doctoral thesis. Bangkok, Thailand: Silpakorn University.
- Fund, I. Y. Y., Townsend, M. A. R., Parr, J. M. (2004). *Teachers facilitating critical thinking in students: The search for a model and a method*. Paper presented at the European Conference on Educational Research, University of Crete, 22-25 September.
- Iamsamang, C. (2012). *The development of peer cognitive model to develop coaching competency and instructional competency enhance analytical thinking skills commercial college teachers*. Unpublished doctoral thesis. Bangkok, Thailand: Silpakorn University.
- Nillapun, M. (2011). An evaluation project to enhance the teacher quality system: The new supervision development activity. *Silpakorn University Journal*, 31(2).
- Prasertcharoensuk, T., Tang, K.N., & Tuksino, P. (2017). The effect of risk management and student characteristics on life skills of higher education students. *Pertanika Journal of Social Sciences & Humanities*, 25(2), 891-906.
- Sekaran, U. (2006). *Research methods for business: A skill building approach* (4th ed.). India: John Wiley & Sons Inc.
- Sungchai, K. (2009). The development of science teachers' instructional supervision model for developing academic capabilities of science talented students. Unpublished doctoral thesis. Bangkok, Thailand: Silpakorn University.
- Tang, K. N. (2018). The importance of soft skills acquisition by teachers in higher education institutions. *Kasetsart Journal of Social Sciences* (in press).
- The foundation for critical thinking. (n.d.). Critical thinking, testing, and assessment. Retrieved from www.criticalthinking.org/pages/critical-thinking-testing-and-assessment/594
- The Institute for Promotion of Teaching Science, Mathematics, and Technology. (2014). *Follow up the results of teaching Science, Mathematics and Technology of the Teacher Grade 9*. Bangkok, Thailand: Research Department of Institute for the Promotion of Teaching Science and Technology.

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Needs Assessment In The Talent Management For Basic Education Schools In Thailand

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Abstract

The purpose of this research were to study the current condition, expected condition, and needed in talent management for basic education schools in Thailand. The sample is 380 school administrators in basic education schools. Data were collected by questionnaire with the 0.874 reliability. Data were analyzed by Priority Needs Index_{modified} (PNI_{modified})

The research found that : The current condition of talent management in basic education school in Thailand is overall level. Considering each component find all the overall level as more. The component with the most current condition is the retaining talent people, rewarding, the development of talented people, and identify the talented people respectively.

The expected condition of talent management in basic education school in Thailand is highest level. Considering each component find all the highest level as most. The component with the most expected condition is the retaining talent people, rewarding, the development of talented people, and identify the talented people respectively.

The needs assessment in the development of talent management in basic education school in Thailand found the component with the highest needs is identify the talented people (PNI_{modified} = 0.148), rewarding (PNI_{modified} = 0.103), the development of talented people (PNI_{modified} = 0.102), and the retaining talent people (PNI_{modified} = 0.084) respectively.

Keywords : *Needs Assessment, Talent, Management, Talent Management, Basic Education School*

Introduction

Good human resources refers to staff members who impose excellent skills and deliver high core competence at work. A proportion of good human resources at the working level accounts for only 3-5 percent of all workers in most institutes while the figure is reported at around 10 percent at the management level. Compared to other lay workers, good human resource people stand out from other lay workers based on the extent of the current and future impacts that the persons have upon their office affiliations. The amount of these qualified people in most offices lessens over time (Garuetin Kulpheng, 2009). Based on a school perspective, being a good staff member means being a teacher or other personnel who have a high degree of work commitment, creativity, work competence, and leadership who can help to direct the schools toward their goals. Therefore, managing talented school staff to get the best out of their capacity requires well-rounded professional skills (Dawruwan Thawinkarn, 2016). The management of talented staff members is done for the purpose of helping the staff to achieve the organization's goals. The capacity exhibited by good staff members exaggerates the survival of the institution and its competitive advantage. Schools represent another form of social units which are comprised of people of different hierarchies, such as administrators, teachers and other educational personnel. These groups of people are the gears that turn the wheels of educational mobilization. School principals should pay attention to carefully carving their staff members into talented associates because learning to manage the existing talented staff is not of secondary importance in school development.

Talent management means exercising measures to support the talented staff. Stated another way, talent management means attempting to obtain, develop, hire, and maintain good staff members within the organization. The principles, relating to talent management, have been consistently developed in different arenas, such as firms in the fields of education, business, and human resources. It is a kind of development that places emphasis on increasing the performance of individuals in alignment with the success of the organizations. When attempting to successfully manage talent in schools, management is often confronted with challenges to the creation of innovation and leadership for educational change. It is advisable for schools to continue their efforts in developing a talented staff and in encouraging networking with external institution. Moreover, it is important to tailor Training curricula that are aimed at developing leadership and talented staff. Accordingly, talent management should be set as a means for identifying, developing, hiring, maintaining and exploiting the talented staff members in the organization (Davies and Davies, 2011). Reviewing the literature related to talent management has shown that this kind of management directs the

schools toward excellence. Rudhambu (2014) investigated the talent management system in Botswana University and discovered that talent management contributes to workings of a progressive school. Agrawal (2010) conducted research about the talent management system of business schools. It was observed in this research that factors indicating of the success of talent management involved the following: school quality, motivation, work advancement, and wages. Annakis, Dass, and Isa (2014) explored factors contributing to the efficiency of talent management in government and private universities. They found that the talent staff's academic perceptions, the talent staff's development, and the culture for the talent staff's development are crucial for the success of talent development. A review of several research studies revealed a similar pattern of findings given the extent that talent management is mainly based on the following factors: 1) identifying talent staff, 2) the development of talent staff, and 3) the rewarding and maintaining of the talent staff {Arunwadee Nuntawattanukul, Pornrat Sadangharn, & Apinya Ing-art (2014), Supaporn Prasongtan (2015), Dawruwan Thawinkarn (2016), Collings and Mellahi (2009), Agrawal (2010), Tymon, Jr., Stumpf, & Doh (2010), Mandloi (2014), Cappelli & Kellahi (2014), Chauhan & Bhatt (2015)}.

Based on the importance of talent management as identified above, schools should be prompted to find effective measures especially for talent staff development. Talent management has not yet been introduced for Thai schools in the basic education system. Furthermore, there are relatively few research studies about talent management in the Thai schools. Consequently, the researcher has gravitated towards exploring the factors and indicators of talent management in the Thai primary schools. It is expected that the results derived from this research will be beneficial in helping the schools to successfully manage their talented people and direct their schools toward their set goals.

Research Objective

To study needs assessment of talent management for primary schools in Thailand.

Literature Review

In order to be able to precisely address the facets related to talent management in the Thai schools in the basic education system, the following documents were reviewed.

Definitions and philosophies of talented people

Talented people are defined based the two classifications below:

Group 1: Talented people can be classified from other members of a group based on their state of being a creator, a rule breaker, an initiator for change, and generator of knowledge. Davies & Davies (2011) explained that talent people are those who are blessed with many different professional skills. Talented people usually spend interesting, enthusiastic and energetic lives. They exhibit high capacity in problem-solving and finally manage to find solutions to the problems via effective use of resources. Similar ideas have been dictated by Apron Phoowittayapan, (2010) who stated that talented people are persons who possess talents, gifts, and characteristics that make them stand out from other candidates. Talented people are good at work and human management. It is important that talented people possess both good virtues and good knowledge since possessing only one of these two qualities does not mean anything for the institutional development.

Group 2: Talented people are associated with the person's traits, such as their capacity and potential. The Office of Civil Service Commission defines talented people as persons with high performances that are well-recognized by their affiliations. Talented people tend to possess high levels of work etiquettes and are prompted to become the crucial strength of organization. Wichai Wongyai (Mo.Po.Po.) regards talented people as those who stand out from the crowd with their creative thinking, high potential, effective performance, talents, and natural abilities. Talented people usually exhibit high degree of achievement and are well-respected by others. They are learning persons who have a passion for escalating their work advancement. Suganya Rasamitamachot (2011) says that talented people are those with high occupational skills that enable them to create superior performances. Talents that people from different fields of professions have can be various and can be based on the nature and culture of the individual organization.

This research study has attempted to investigate the management of talented people in Thai primary schools. The term, "talented people", is defined under the Thai school context as teachers or educational personnel who generate an outstandingly high level of performance as evidenced by their levels of education, academic positions, awards, and other empirical evidences. The impacts that talented teachers have on students, school and communities are used for locating talented teachers. More importantly, there are 11 desirable qualities for high school work potential that have been used to indicate talent teachers as follows: 1) demonstrating achievement-based performance, 2) giving good service, 3) having professional expertise, 4) endorsing justice and ethics, 5) demonstrating teamwork, 6) having bureaucratic commitment, 7) being creative, 8) having an holistic viewpoint, 9) being devoted to the public, 10)

participating in interpersonal interaction, and 11) being a learning person. The evaluation of these talents was based on the criteria imposed by the Office of Civil Service Commission.

Principles relating to talented people management in schools.

Josh Bersin (2007) imposed 8 steps for talented teachers evaluation as detailed below:

1. Workforce planning
2. Recruiting
3. Onboarding new employees
4. Performance management
5. Training performance support
6. Succession planning
7. Compensation and benefits
8. Critical skills gap analysis

Birchall, Holley & Reid (2008) applied human resource principles into the development of talent people and postulated 5 steps involved in the development of talented people.

1. Identification
2. Development Opportunities for Talent
3. Transparency
4. De-Selection
5. Creating Developmental Opportunities for The Talent Pool

Factors relating to the management of talented people in schools

After reviewing a hundred of documents with themes concerned with the components of managing talented people, the factors needed for managing talented people in school have been clarified in Table 1.

Table 1: Components, definitions, and sub-components for managing talented people in basic education schools

Components	Definitions	Sub-components
1. Identifying	The process of identifying talented people should be systematically carried out in order to be able to correctly specify the members of the talented group and to direct the appropriate development for them.	1) Planning personnel 2) Determining the talented people 3) Defining the key positions 4) Evaluating the advanced practitioners
2. Developing Talented People	Encouraging talented people with respect to their professional development in order to enhance their work potential.	1) Offering challenging assignments 2) Giving Empowerment 3) Enhancing the abilities of the talented people
3. Rewarding	Finding prevailing ways to increase the motivation of the talented people via forms of subsidization or other rewards.	1) Allocating incentives 2) Strengthening trust 3) Receiving recognition from the team 4) Strengthening the spirit
4. Retraining Talented People	Finding ways to retain talented people with the organization, increasing their patriotism & loyalty, and giving in for organizational development.	1) Strengthening the dialogue 2) Creating a supportive work environment 3) Developing role-models

Needs Assessment

Needs assessment is the process of value judgment or discretion to consider any one thing. By collecting and analyzing data. To obtain useful information in decision making and select the best choice. The research needs assessment is to determine the significance level of the needs assessment of talent management of primary school in Thailand. By evaluation framework principle 4 elements include: 1) Identifying 2) Developing Talented People 3) Rewarding 4) Retraining Talented People.

Research Methodology

- 1) Reviewing a hundred of documents with themes concerned with the components of managing talented people
- 2) Study current condition, desirable condition and needs assessment of talent management of primary schools in Thailand.

Instrument Of Research

Instrument is questionnaire needs assessment with 52 items that needs assessment of talent management of primary schools in Thailand. It is 5-level scale.

Sample Of Research

The sample is the primary school principals. Under the office of basic education study in 2560 of 380 people by multi-stage random sampling that determine the sampling size by using the concept of Hair et al. (1998) proposed criteria.

Data Analysis

Data were analyzed by mean, standard deviation, and Priority needs index : PNI modified

Results

The study found the main elements are 1) Identifying 2) Rewarding 3) Developing Talented People 4) Retaining talented people respectively. As shown in table 2.

Table 2: The needs of talent management for primary schools.

Components	Current condition			Desirable condition			PNI _{modified}	rank
	\bar{X}	S.D.	Translate	\bar{X}	S.D.	Translate		
Identifying	4.00	0.65	More	4.59	0.56	Most	0.148	1
Developing Talented People	4.25	0.60	More	4.69	0.51	Most	0.102	3
Rewarding	4.28	0.59	More	4.72	0.47	Most	0.103	2
Retraining Talented People	4.37	0.57	More	4.74	0.46	Most	0.084	4
Total	4.23	0.55	More	4.69	0.48	Most		

Conclusion And Discussion

The element has the highest needs is identifying talented people. According to Davies and Davies (2011) explained that identifying the talented person is the important role of school administrators. How to identify people who are doing a great job in their present role and how to help them to develop their potential is a vital process for the management of talent. The second element of needs is rewarding. According to Thome, Kaye, & Pellant, Andy (2007) suggested that the reward is associated with the assessment that talented people receive. Talented people want to be praised and admired for their success. So, the allocation awarded to people is so important. The third element of needs is developing talented people. According to Wichai Wongyai. [Mo.Po.Po]. explained that developing talented people is to increase knowledge, skill, abilities to plan, personal development training, in parallel with the operating. To evaluate the performance and potential of personnel to know who are the best people and then continue training and development, with both the knowledge, skills, expertise, operational or technical expertise. The fourth element of needs is retraining talented people. According to Davies and Davies (2011) suggested that retained people is important. Especially to communicate by talking to colleagues, the leadership skills needed to manage people in schools. Which held that expresses sincerity and build trust with colleagues or subordinates. The leader should demonstrate confidence in their abilities and competencies and a willingness to accept the opinions of others.

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References

Agrawal, Swati. (2010). Talent Management Model for Business Schools: Factor Analysis. *The Indian Journal of Industrial Relations*, 45(3), 481-491.
 Annakis, Dass,& Isa. (2014). Exploring Factors that Influence Talent Management

- Competency of Academics in Malaysian GLC's and Non- Government Universities.
Journal of International Business and Economics, 2(4), 163-185.
- Apron Phoowittayapan, (2010) . *Strategies for talent people management*. Bangkok's H.R. Center.
- Aroonroong Au-Arisooksakul and Thirawat Juntuek. (2015) Strategic management for talented people: Factors for sustainable competitive advantage. *Journal of Humanities and Social Sciences and Arts, Silapakorn University*. 8(3), 1096-1113.
- Arunwadee Nuntawattanukul, Pornrat Sadangharn, & Apinya Ing-art (2014). Model for talent and good people management of the electronic and electrical industrial entrepreneurs. *Journal of Business Management, Bhurapha University*. 1(1), 55-71.
- Birchall, David., Holley, Nick., & Reid, Benjamin. (2008). *Talent Management*. Retrieved on 30th July, 2015. from <http://www.henley.ac.uk/research/research-centres/henley-centre-for-hr-excellence/SP2>.
- Chauhan, Pratapsinh, & Bhatt, Kinjal. Managing People of an Organization Through Talent Management: A Factor Analysis Approach. *IJSR – International Journal of Scientific Research*, 238-241.
- Choochai Samitigrai. (2007). *Personnel Training*. Third Edition. Bangkok: Chulalongorn University Press.
- Chuchai Samitigrai. (2013). *Recruitment, selection and evaluation of personnel*. 4th Ed. Chulalongkorn University Press.
- Collings, David G., & Mellahi, Kamel. (2009). Strategic talent management: A review and Research agenda. *Human Resource Management Review*, 19 (2009), 304-313.
- Davies, Brent., & Davies, Barbara J. (2011). *Talent Management in Education*. London: SAGE Publication.
- DawruwanThawinkarn. (2016).The Talent Management in the 21st Century. *Journal of Education, Khon Kaen University*. 39(2), 15-22.
- Dessler, Gary. (2011). *Human Resource Management*. Boston: Pearson.
- Garuetin Kulpheng. (2009). *How to prevent losing of good staff*. Bangkok H.R. Center.
- Hair, Jr., J. F. et al. (1998). *Multivariate Data Analysis with Readings*. Englewood Cliffs, NJ: Prentice-Hall.
- Jomphong Mongkolwanich (2012). *Organization and personnel management in education*: Bangkok: Chulalongkorn University Press.
- Josh Bersin(2007). *Talent Management Changes HR*. Retrieved on 20th June, 2016. from <http://joshbersin.com/2007/06/talent-management-changes-hr>.
- Mandloi, Namrata. (2014). Talent management: A strategic approach towards growth in IT industry. *Research conference on Innovative Business Strategies*. SIBM, Pune, 28-29 March.
- Rothwell, William J., Chee, P., & Ooi, J. (2016). *The Leader's daily role in talent management*. Singapore: Mcgraw-Hill Education.
- Rudhumbu, Norman. & Maphosa, Cosmas. (2015). Implementation of Talent Management Strategies in Higher Education: Evidence from Botswana. *J Hum Ecol*, 19(1-2): 21-32.
- Suganya Rasamitamachot, (2011). *Talent Management by Competency-Based Career Development and Succession Planning*. Bangkok: Print City.
- Supaporn Prasongtan. (2015). Talent Management: Tools to increase the capacity of the organization. *Srinakharinwirot Business Journal*. 6(2), 145-150.
- Suwimon wongwanich. (2015). *Needs assessment research*. 3rd Ed. Bangkok: Chulalongorn University Press.
- Thome, Kaye. & Pellant, Andy. (2007). *The Essential Guide to Managing Talent*. Kogan Page Limited.
- Thunnissen, Marian. (2015). *Talent Management in academia*. [n.p.]: Dutch universities.
- Tymon Jr, Stumpf, & Doh. (2010). Exploring talent management in India: The neglected role of intrinsic rewards. *Journal of World Business*, 45 (2010), 109-121.
- Wichai Wongyai. [Mo.Po.Po]. *Talent Management*. Retrieved on 1st March, 2016. from <http://www.curriculumandlearning.com>.

New Approaches To Creativity In Music Education: Soundpainting In Teacher Training

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Abstract

The following research is motivated by the conviction that music and the arts in general should be present in teaching and learning activities, in such a way that is useful to and connected with student practices, trusting in the learner's ability to establish links, and to work in the face of uncertainty and surprise. A collaborative participation is taken as a fundamental when embarking on an exploration like this, which is both individual and collective. When creative activities are carried out in a group and the opportunities arise to improvise together, this all happens in real time, straight away: it occupies mind and body together, and signifies an understanding of content on different levels which move between social consensus and individual expression, and present children with the opportunity to take advantage of their own natural inclinations and fulfill different types of musical activities. In accordance with these premises, we carried out a case study on the training of music teachers, exploring collaborative practices using Soundpainting language with the aim of incorporating tools for creative learning. The research methodology is qualitative; it employs the analysis of student's diaries and group interviews. The main findings show that the application of the language of Soundpainting allows its participants to trust in their own creative capacity and in their possibilities to use this language as a source in their future practices.

Key words: *Creativity, music education, soundpainting, teacher training.*

Introduction

This study starts out from the desire to explore the potential role of improvisation and creativity as a vehicle for building new relations between students and music, for transforming the music room into a place where knowledge is conveyed in order to act and think, with the aim of liberating the mind (Kanellopoulos, 2007).

Experiences such as those carried out by Paynter (1992), Schafer (1965, 1986) and Delalande (1995, 2013) have been led by the conviction that unless children experiment, improvise and compose, music education will be dominated by structured sound exercises which are closed and exclusive. The focus of these composers and educators has been not only to discover children's creative potential but also to propose innovative approaches to the exploration of sound which will open the way towards every kind of music.

However, music education is dominated by technical concepts characterised by what Regelski (2002) calls methodolatry, giving undue importance to methods, which "limits the wide field of possibilities that can be applied in music education" (Loizaga, 2007, p. 216). As a consequence, the place and the role of improvisation in music education is not always addressed adequately. Experimentation and respect for the students' voices are key aspects in knowledge and skill acquisition; the desire to control, to predict what will happen, to know what works, derives from lineal, progressive processes which are an obstacle to critical questioning and fulfilling experiences. It is important that the teaching staff are prepared to ask themselves what they are teaching and why, to follow paths that their real-time exploration might take them, and to trust in their pupils' potential to build dialogues through improvisation. Equally, teachers need to feel comfortable working as co-musicians rather than instructors, enabling students to develop their intentions freely – both in terms of musical activities and discussions. It is not simply a question of including improvisation as a technique, focused on output, but rather of using it as a means or process through which to develop a way of thinking and acting (Burnard & Boyack, 2017) which is neither linked to nor restricted by any aesthetic limitations related to improvisation techniques (Kanellopoulos, 2007).

To this end, music teaching must be flexible and creative, and permit pupils to participate in a way that is spontaneous, as interpreters, composers, improvisers, and singer-songwriters, allowing music to help their emotional well-being and allowing young people to develop their imaginations and carry out activities for themselves (Burnard & Murphy, 2017). A fundamental condition for this is that music teachers trust in their own creative capacity and in their possibilities to act as a source of creativity and invite their future pupils to develop their imaginations, carrying out activities related to improvisation and creativity which will form a large part of their music classes. This means working towards a style of pedagogy based on principles – rather than set-pieces – in which the pupils can converse, create and lean on their own musical experience, knowledge and understanding, to participate, in a creative manner, in the here

and now (Burnard, 2017). Glover (2002) underlines the need to promote creativity with a demand that goes beyond technical skills, and connects with values, risk and courage. It is a question of seeing the primary classroom as a dynamic learning community founded on the supposition that creativity is a social and cultural construct in which the commitment to compose music on the part of teachers and pupils can be seen in and around their own personal spaces; it can additionally be seen as a classroom where the teacher generates the questioning and exploring of ideas while keeping options open (Burnard, 2017, p. 84). Odena and Welch (2012) also attach value to teachers being more open, not just when it comes to preparing the classroom environment, but when evaluating their students' work.

Along the same lines, the idea of free and collective improvisation designates a style of performance which does not have the objective of emulating determined musical styles but rather strives to experiment with sounds and techniques and ways of structuring sound, starting out with an idea that might be simple and then proceeding from there to explore sounds and the relations between sounds and musicians, as specific ways of being together in and through music. It is about developing an approach which looks to make music with children, instead of making music for children. The improvisatory process does not refer only to the realisation of a defined structure, or application of a pre-existing technique; it is an act of discovery with no aspirations beyond itself. An improvisation does not have a perfect model to aspire to; when you improvise, you are embarking on a series of musical actions which have a meaning beyond their realisation. The music speaks and then disappears. Improvisation conceived in this way has important educational implications since it presents a vision of learning which contrasts with the accumulation of abilities; the key to this learning is to look for ideas in situ, to trust in intuition and to develop the ability to respond to your own sounds and those of your classmates, with no other purpose than making them for their own sake, with no fixed expectation (Kanellopoulos, 2007).

From this perspective, there is a need, starting from the initial training of music teachers, to introduce new, experiential initiatives, which are articulated through creative, collaborative projects and accompanied by tools which prompt reflection and the interchange of ideas. It often happens that primary teachers, during their training, have not had the positive experiences which allow them to grow in confidence as teachers and creative people, and thus they encounter difficulties in carrying out their classes in this way. The teacher's job in the classroom is to contribute to the development of their pupils' creative abilities, stimulating them to generate ideas (Hickey, 2009; Giráldez, 2014), but it is evident that teachers require practice to help them with this. Carrillo and Vilar (2012) state that the skill relevant to the development of a person's ability to create music is one of the least utilised by teachers, arguing that the limited preparation received in the activity of creating music in their initial training could be partly responsible for its scarce use in practice. Koutsoupidou (2005), in her study of primary school teachers' work with improvisation, found that they were more likely to use it in their classes if this kind of activity had been a part of their higher education. According to Beineke (2017), several studies centred on composition exercises in music education have found that the lack of training and experience and the use of inadequate methodologies make it difficult to develop creative activities. All of which leads us to affirm the need to reinforce the level of preparation that teacher training programmes provide for music creation, with the objective of achieving the wider employment of this skill in a practical setting.

Soundpainting is a tool which provides for all of these premises. It is a language of gestures, created by Walter Thompson, which allows for improvisation and creativity in real time. The soundpainter, through set gestures, asks for a material with which to create a global proposal integrating the different contributions of the participants (Thompson, 2006). The learning of Soundpainting language starts out from a non-traditional area of music education, whereby the students learn the parameters of each gesture of the language of Soundpainting according to their abilities. Any student can participate, whatever their level of musical competence, which eliminates the barriers and learning norms. For Thompson (2009), it is fundamental that in musical learning we use who we are and what we already have inside us. He affirms that in order to interpret music, it is vital that the student uses their own skills, and does not focus on what they cannot do, and the language of Soundpainting fulfills this criterion. Its use in the ambit of education is conditioned in some way by the need to provide students with an environment in which they can express themselves with confidence through sound, movement and images. Wigram (2004) conceives musical education as the combination of sounds created from a setting of trust, and Burnard (2017) notes the need to communicate acceptance and to build a shared idea between teacher and pupil; Burnard, Boyack and Howell (2017) proffer suggestions for developing the composition process which begin with the idea of developing self-confidence, of making everyone feel that they are a composer: through exploring, experimenting, discovering, building, revising, interpreting, practising, collaborating and co-operating. In this sense, Soundpainting can also contribute in a positive way by generating a climate of trust, for both teacher and pupil (Bilgin & Çoşkuner, 2017), since one of its basic premises is that errors do not exist; any

material offered by the participants can be used by the Soundpainter, integrating it into their creative discourse, which thereby enables the participants to feel free to develop their creative powers.

Equally, Soundpainting allows for a multi-disciplinary use, offering the possibility of integrating simultaneously different artistic expressions: music, dance, drama, visual arts. If teachers in their initial training can gain a familiarity with this tool, it can help the understanding of their own sound experience through exploring with their own voice, with their body, with images or with instruments or sound objects, as well as boosting their interest in other forms of sound expression (Çoşkuner, 2016). In a Soundpainting performance, the participants' concentration grows and its practice contributes additionally to the development of their motor and improvisational abilities (Vidal & Morant, 2017). There is no avoiding the fact, also, that group improvisation signifies a complex and enriching artistic space for all involved; a space where, according to what is perceived, the different participants interact among themselves, and each one interprets what is happening in the moment of interpretation (Burnard, 2002; Burrows, 2004). In this sense, Soundpainting is conceived as an artistic conversation between the Soundpainter and the interpreters (Giacco & Coquillon, 2016), involving a collective action in which the group expresses itself through exploration and creativity – something which is especially relevant for our research.

To follow on, we should underline the main aim of this study which is to describe and analyse an experience that teacher training students in music have realised through Soundpainting language, both in their musical training and their future teaching work. From this general objective, the following specific objectives follow:

- To explore the possibilities of Soundpainting as a mean of improving the professional abilities of future music teachers in primary education.
- To investigate Soundpainting's suitability for the reinforcing of musical and creative abilities.

Contextualising the experience

The proposal was carried out with 29 students taking the subject of Instrumental Training, which is part of the final year of a teacher training degree, for those specialising in music. It began in September and ended in December. The students had no prior knowledge of Soundpainting and it was noted that their experience of creative activities in previous courses had been scarce. Yet they decided to work with this language and to link it to their future career.

We designed the activity through a collaboration with a music school and with four primary schools nearby, as well as with a Soundpainter to oversee the process. It was agreed that once they had internalised some beginner-level signs, the university students would go to those schools to practise them with the pupils. The work began with presenting the syntax of the language, which is articulated through four points: who, what, how, and when. The Soundpainter must use the signs in this order. However, the how is not always used by the Soundpainter, to give those interpreting more scope to improvise, to choose the tone and the quality of their production. The principles of Thompson's ideology (2006) were explained, and it was stressed that – in the event of any doubt – those interpreting should continue to create, regardless of the elements being used, unless they received a clear indication from the Soundpainter to pass to another sign. It was also stressed that there are no errors; if somebody accidentally interprets a different sign, they must continue with what they have understood until the next gesture. It was also highlighted that Thompson (2006) underlines the difference between conductor and Soundpainter: the former is an interpreter and the latter a composer. This is a crucial point because the students must understand this distinction in order to participate actively in the creative process. Subsequently, the students were gradually introduced to some basic, beginner's level gestures with which they carried out the first compositions. They reproduced the gestures at the same time as the teacher in order to integrate them better. After the first two sessions, they had the opportunity to take the place of the Soundpainter and to lead the class.

In these following sessions, they began to prepare the classes they were going to deliver at the primary schools. Working together, they designed the presentation of the language of Soundpainting, agreeing the signs they were going to produce, and establishing which ones they would work with for more musical concepts, related to sound parameters, different instruments, voice and body percussion and short musical phrases. They were introduced to signs related to elements such as the sounds of the wind, of laughter, of freezing. They also agreed on different strategies as regards the order of the presentation of the different signs and the incorporation of sound objects. In the university class sessions, they kept interchanging the roles of Soundpainter and interpreter in order to design a practical session and gain confidence in their potential. The school visits were a success since, because of the methodology applied, they had the opportunity to assume the teacher's role and the school pupils took on the instructions in a quick, intuitive

way. At the end of each session, the pupils noted what they had learned in their personal diaries, how it had been carried out, how they had felt, and the difficulties and positive aspects.

Running parallel to the work in the university classroom, we undertook an activity involving a small Soundpainting orchestra, meeting outside school hours and made up of teachers and pupils from the music school, the university and primary schools, as well as local actors and dancers. Given the interest this activity generated among the participants in the orchestra, a final performance was organized and the teachers and pupils of the primary schools were invited to take part altogether. Overall, the participants in this performance comprised a Soundpainter, university lecturers, music school teachers, and university and music school students – all of whom were involved in the Soundpainting orchestra – as well as 204 primary schoolchildren in the audience, and the experts in visual arts who were also taking part.

Research process

This research is presented as a case study, and a strategy that looks deeply into and delivers an exhaustive and holistic description of a single or multiple structure within a specific time frame (Creswell, 2013). In our research, we used two instruments for collecting data, the students' class diaries and group interviews. According to the ethical guidelines, we asked those participating for permission to carry out the study and divulge any information contributed, guaranteeing their anonymity. Twenty-nine people took part (20 women and nine men), all of them fourth-year students on the teacher training degree in Primary Education, specialising in music education, during the 2017/18 academic year.

In this study, the diary was used as an instrument for research and self-development, helping to give a structure to thoughts and experiences; additionally, it helped us with the collection of important data, and their analysis and systemisation (Jurado, 2011). In accordance with this, at the beginning of the course the students were asked to complete a diary after each session, making note of what they had learned and their experiences, thoughts and reflections. The objective was to understand the process experienced in the Soundpainting project, and the possible influence on each participant's creative and musical development and their future teaching work. Following Jurado (2011), we established the importance of showing and sharing with other colleagues the information gathered in the diaries; on top of this, a series of group interviews were recorded on video in which the students had the opportunity to discuss their experience together.

Prior to these group meetings, a series of initial categories was defined: the development of creative, musical and professional abilities. These were related to the research objectives and complemented the findings of the first analysis of the diaries, using a content analysis technique which involved grouping the data into different categories for analysis. The categorisation process consisted of looking for common themes which made it easier to obtain results related to the goals of the experience (Coffey & Atkinson, 2003). These categories, just as we will explain, were inductive-deductive; inductive, because they came out of the replies, and deductive because they were based on a literature review on Soundpainting.

Discussion of results

To carry out the analysis of the diaries and the group interviews, we performed an initial analysis which involved a detailed reading of the diaries and interview transcripts, allowing the participants' voices to emerge and making a first selection of the themes that kept on arising; this allowed us to put together a tool of data analysis and interpretation that we call the categorial system. This option is justified by our wish to integrate what happens in reality. At the same time, this was contrasted in a deductive way by the methodological principles that come from experience, generating an emerging categorial system.

Lastly, taking these defined categories and with the participants' voices behind it, we built a categorial system. In an attempt to respond to the objectives we had initially proposed, we proceeded to structure the results around three key elements, corresponding to the categorisation carried out: the development of creative, musical and professional abilities.

Table 1. Categories y subcategories referenced

CATEGORIES	SUBCATEGORIES	N° Diary references	N° Group interview references	N° Total references	%
Development of creative abilities		28	34	62	19.38%
	<i>Intuition</i>	4	9	13	4.06%
	<i>Freedom</i>	10	9	19	5.94%
	<i>Exploring sound material</i>	7	9	16	5.00%
	<i>Confidence in creative abilities</i>	7	7	14	4.38%
Development of professional abilities		95	108	203	63.44%
	<i>Autonomous learning</i>	5	6	11	3.44%
	<i>Co-operative learning</i>	14	10	24	7.50%
	<i>Language adaptation by levels</i>		7	7	2.19%
	<i>Ludic activity</i>	9	9	18	5.63%
	<i>Calmness</i>	3	8	11	3.44%
	<i>Confidence in teaching abilities</i>	15	12	27	8.44%
	<i>Responsibility</i>	1	4	5	1.56%
	<i>Memory</i>	1		1	0.31%
	<i>Attention</i>	8	3	11	3.44%
	<i>Innovation</i>	4	9	13	4.06%
	<i>Concentration</i>	1		1	0.31%
	<i>Exploring other roles (protagonist)</i>	13	10	23	7.19%
	<i>Motivator</i>	13	9	22	6.88%
	<i>Learning to listen</i>	3	9	12	3.75%
	<i>Diversity</i>	1	8	9	2.81%
	<i>Planning</i>	1		1	0.31%
	<i>Multi-disciplinary possibilities</i>	3	4	7	2.19%
Development of musical abilities		18	37	55	17.19%
	<i>Trying different instruments</i>	6	10	16	5.00%
	<i>Openness to other styles</i>	7	9	16	5.00%
	<i>Experimenting with music</i>	2	8	10	3.13%
	<i>Musical characteristics (sound parameters, musical syntax)</i>	3	10	13	4.06%
TOTAL		141	179	320	100%

The abilities that the students interviewed believe can be developed through this experience – in which Soundpainting plays a central role – are set out, as Table 1 shows, in three categories, as the following shows:

-Development of creative abilities. Through the analysis of the information gathered in the diaries and group interviews, we can see that this is regarded as a particularly valid experience for the development of these abilities (19.38%). Of these abilities, freedom was the subcategory that received most mentions (5.95%), followed by the opportunity presented to Explore sound material (5.00%) and Confidence in creative abilities (4.38%). The students' voices, both in the diaries and interviews, tell us that, while for some it was a relief that "errors do not exist", for others this was uncomfortable at first – especially for those with a more traditional musical background, in conservatories and music schools, where they learned to "repeat a repertoire". These students say that they are used to learning music through imitation and to playing with a score, meaning they found it difficult at first to improvise. However, after the first sessions, they began to feel more comfortable, and they believe it is a way of learning music that provides a lot of freedom, as well as the opportunity to interpret and experiment with different instruments even without the necessary technique.

-Development of professional abilities. This is the category which earns the highest number of references (63.44%). Within this category, Confidence in teaching abilities (8.44%) is mentioned the most, followed by Co-operative learning (7.50%), Exploring other roles (7.19%) and Motivator (6.88%). The school visit and opportunity to interact with pupils struck them as particularly enriching; they had previously enjoyed preparing for the visit, by allocating the different roles, practising the visit in class, working together in groups under their own initiative, interchanging ideas and possible sequences for the phrases, self-evaluating, and correcting. At the same time, Soundpainting enabled them to establish contact very quickly with the school pupils, who wanted to take part not only by interpreting but also by adopting the role of Soundpainter; all of which was pivotal in transmitting confidence to them in their role as teachers. The ludic quality of Soundpainting allowed it to be seen as a game, and this enabled a certain shedding of inhibitions; if some were shy at first, they teamed up in pairs and in the end everybody took part. Furthermore, they agreed that it was a highly motivating way of working with sounds, one that is open, dynamic and creative.

-Development of musical abilities. This category receives the third most references (17.19%). The highest number of statements regarding the subcategories concern Trying different instruments and Openness to other styles (5.00% each). The students experienced other possible forms of musical education – approaches that allow for more integration, and the incorporating of different levels of knowledge and ability into musical activities, as well as the exploring of ideas and processes and an openness towards all kinds of music. We wish to highlight also the fact they were struck by the speed with which they learned the gestures and were able to carry out musical productions. It helped them hugely – in a very intuitive fashion – to interiorise concepts such as sound parameters (intensity, pitch, tone, duration) and practise them.

Finally, we would like to underline that, according to the voices gathered, the act of delivering the final performance, with artists on the stage, allowed them to experience the integration of different artistic disciplines and this proved very enriching. Moreover, the characteristics of the language of Soundpainting enabled a manner of active participation that they had not known in any other type of show or concert. Equally, they said that they felt they had gained a freedom and certain complicity from meeting the primary-school pupils, thanks to the school visit, and sharing the experience of the concert with them. Additionally, they affirmed that the use of a diary as a tool for self-development, and the opportunity to visit the centres and teach Soundpainting to primary pupils, as well as to exchange experiences as a group and compare them with their colleagues and teachers, helped them to structure their thoughts and experiences – something which will be of great use to them in their future as teachers – as well as to reflect on and feel confidence in their creative possibilities.

Conclusions

The participants stated that this educational process had developed their sensitivity with regards to understanding how to relate to students creatively. They also said that the act of getting involved in activities with primary school pupils, and with a Soundpainting orchestra, and feeling like participants in a collective project, had helped them to feel engaged and confident about developing their professional work in a way that encourages innovation and integration.

The application of the language of Soundpainting provided tools to guide future teachers in the design and implementation of projects which promote collective creativity, the generation of ideas, and the ability to organize events based on the creative processes. The implementation of this experience allowed its participants to open their

minds as well as offering norms to change ways of thinking and moving forward with the creative and musical training of future teachers. Soundpainting is a way of focusing teaching on the recognition of the quality of the process of artistic creativity, rather than the analysis of the final product. It makes it possible to understand creativity as an activity which develops different abilities and critical thought in a collaborative space. To conclude, we will note the words of one student after his first Soundpainting class:

“None of us knew anything about this language but it was clear that, as well as surprising us and having an impact on us, it succeeded in motivating us and we actually enjoyed the music. With Soundpainting we can learn to listen, and promote group work, improvisation and real-time composition. What is more, we were able to become composers and lead a group – and if it had an impact on me, imagine how a child might experience it! ... Through this language we will succeed in integrating diversity and opening the limits of children’s imaginations.”

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References

- Beineke, V. (2017). Componiendo colaborativamente en la escuela: entre teorías y prácticas en el campo del aprendizaje musical creativo. *Revista Internacional de Educación Musical*, 5, 31-39.
- Bilgin, Y. & Çoşkuner, S. (2017). Effects of soundpainting studies on students’ self-confidence. *International Periodical for the Languages, Literature and History of Turkish or Turkic*, 12(4), 91-110.
- Burnard, P. (2002). Investigating children’s meaning-making and the emergence of musical interaction in group improvisation. *British Journal of Music Education*, 19(2), 157-172.
- Burnard, P. (2017). Teaching music creatively. In P. Burnard & R. Murphy, *Teaching music creatively* (pp. 1-12). Abingdon, Oxon (UK): Routledge Abingdon, Oxon (UK): Routledge.
- Burnard, P. & Boyack, J. (2017). Engaging interactively with children’s group improvisations. In P. Burnard & R. Murphy, *Teaching music creatively* (pp. 26-38). Abingdon, Oxon (UK): Routledge.
- Burnard, P., Boyack, J. & Howell, G. (2017). Children composing: Creating communities of musical practice. In P. Burnard & R. Murphy, *Teaching music creatively* (pp. 39-59). Abingdon, Oxon (UK): Routledge.
- Burnard, P. & Murphy, R. (2017). *Teaching music creatively*. (2nd. edition). Abingdon, Oxon (UK): Routledge.
- Burrows, J. B. (2004). Musical archetypes and collective consciousness: Cognitive distribution and free improvisation. *Critical Studies in Improvisation*, 1(1). Retrieved from <http://www.criticalimprov.com/article/view/11/35>
- Carrillo, C. & Vilar, M. (2012). Las competencias profesionales del profesorado de música opiniones de una muestra de docentes. *Cultura y Educación*, 24(3), 319-335.
- Creswell, J.W. (2013). *Qualitative inquiry & Research design: choosing among the five approaches*. (3rd edition) Los Angeles, CA: Sage.
- Coffey, A. & Atkinson, P. (2003). *Encontrar el sentido a los datos cualitativos. Estrategias complementarias de investigación*. Medellín: Editorial de la Universidad de Antioquia.
- Çoşkuner, S. (2016). Effects of Sound painting applications on performance. *Educational Research and Reviews*, 11(15), 1351-1354. DOI: 10.5897/ERR2016.2753
- Delalande, F. (1995). *La música es un juego de niños*. Buenos Aires: Ricordi.
- Delalande, F. (2013). *Las conductas musicales*. Santander (Spain): Universidad de Cantabria.
- Giacco, G. & Coquillon, S. (2016). On the Process of Sound Creation: Some Models for Teaching Artistic Creation in Music Using a Soundpainting Project in a French Primary School. *Visions of Research in Music Education*, 28.
- Giráldez, A. (2014). Enseñar y aprender en el aula de música. In A. Giráldez (coord.), *Didáctica de la música en Primaria* (pp. 39-76). Madrid: Síntesis.
- Glover, J. (2002). *Children Composing 4-14*. London: Routledge.
- Hickey, M. (2009). Can improvisation be ‘taught’? A call for free improvisation in our schools. *International Journal of Music Education*, 27(4), 285-299.
- Jurado, D. (2011). El diario como un instrumento de autoformación e investigación. *Qurrriculum: Revista de teoría, investigación y práctica educativa*, 24, 173-200.

- Kanellopoulos, P. (2007). Musical Improvisation as Action: An Arendtian Perspective. *Action, Criticism, and Theory for Music Education* 6/3. Retrieved from http://act.maydaygroup.org/articles/Kanellopoulos6_3.pdf
- Koutsoupidou, T. (2005). Improvisation in the English primary music classroom: Teachers' perceptions and practices. *Music Education Research*, 7(3), 363-381.
- Loizaga, M. (2007). Thomas Adam Regelski. In M. Díaz y A. Giráldez, *Aportaciones teóricas y metodológicas a la educación musical. Una selección de autores relevantes* (pp. 211-219). Barcelona: Graó.
- Odena, O. & Welch, G. (2012). Teacher's perceptions of creativity. In O. Odena (Ed.), *Musical creativity: Insights from music education research* (pp. 29-49). Surrey: Ashgate.
- Paynter, J. (1992). *Sound and Structure*. Cambridge: Cambridge University Press.
- Regelski, T. A. (2002). On 'methodolatry' and music teaching as critical and reflective praxis. *Philosophy of Music Education Review* 10(2), 102-23.
- Schafer, R. M. (1965). *The composer in the classroom*. BMI Canada.
- Schafer, R. M. (1986). *The thinking ear: Complete writings on music education*. Arcana Editions.
- Thompson, W. (2006). *Soundpainting: The art of living composition, Workbook I*. New York, NY: Author
- Thompson, W. (2009). Soundpainting: el arte de la composición en directo. *Eufonía: Didáctica de la música*, 47, 77-83.
- Vidal, O. & Morant, R. (2017). Aplicaciones didácticas del lenguaje Soundpainting en diferentes ámbitos educativos: una herramienta para la creación en tiempo real. *Revista Electrónica Complutense de Investigación en Educación Musical*, 14, 329-349.
- Wigram, T. (2004). *Methods and Techniques for Music Therapy Clinicians, Educators and Students*. London: Jessica Kingsley Publishers.

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Obstetric Triage Acuity Scale Setting To Turkish

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Abstract

The rate of maternal mortality in the world and our country is unacceptably high. Women die as a result of complications during and after pregnancy and delivery. Most of these complications develop during pregnancy and many can be prevented or treated. In protecting maternal health, it is vital that obstetric problems can be identified at the earliest time and appropriate treatment and care can be provided. In order to prevent maternal / mortality and morbidity, it is inevitable to develop a triage scale specific to obstetric acuity in order to ensure that health personnel are able to perform the earliest and appropriate intervention in an emergency obstetric situation or, if necessary, refer the patient to the procedure promptly. In Turkey, there is no nationally accepted classification system for the standardization of obstetric triage of patients coming to the complaint. The purpose of this study is to plan the language validity and coverage of the obstetric triage urgency scale. The study was conducted between 01.01.2018 and 30.03.2018 at Akdeniz University Hospital Emergency Service Triage Unit in Antalya city center. Statistical Package for the Social Sciences (SPSS) 20.0 software package program was used to analyze the data obtained from the research. For this study, the language expression content index is 0.983 and the scale content index is 0.8636. As a result, the language expression content index for this study is 0.983, it has a very high content validity, and the scale content index is 0.8636 in terms of language expression, and our scale has a content validity close to perfection.

Keywords: *Obstetric triage acuity scale, Obstetric emergencies, Obstetric triage, Triage.*

Introduction

Triage is the process of prioritization of healthcare services according to the urgency of the care and treatment needs of the patient and is often used in healthcare for emergencies (Evans et al., 2015). The development of the emergency care triage system allows standardization of care and better utilization of resources (Gratton et al., 2016), while determining which patients should be evaluated urgently and which can be safely waited for. Standard workflows and acuity indexes benefit the nursing profession by creating standards and expectations. Patient care is elevated through the practice of the nursing staff measuring, monitoring, and disseminating patient care quality indicators and metrics, and working to continuously improve patient outcomes (DePaoli, 2016). Emergency triage used in the literature; Canadian Triage Acuity Scale (CTAS), Emergency Severity Index (ESI) and Manchester Triage System (Mackway-Jones, 1997; Eitel et al., 2003; Bullard, Unger, Spence, Grafstein, 2008). These scales include limited practice for obstetric triage and do not reflect special triage needs of obstetric patients. The Association of Women's Health, Obstetric, and Neonatal Nurses (AWHONN, 2016), has also created a 5-level obstetric acuity index tool. The Obstetric Triage Acuity Scale (OTAS) has been developed because of the limited obstetric markers of triage clearness scales (Smithson, 2013). OTAS was modeled on 5 categorized CTAS instruments and Smithson et al. (2013). Obstetric triage is the entry into labor and delivery and the obstetric operating rooms, and patients should be evaluated for life-threatening risk factors and dangers immediately upon arrival, rather than waiting to be seen on a first-come-first-served basis. The implementation of obstetric triage standards and the utilization of an obstetric triage index have the potential to dramatically increase throughput, patient outcomes, patient safety, and patient satisfaction (DePaoli, 2016). In protecting maternal health, it is vital that obstetric problems can be identified at the earliest time and appropriate treatment and care can be provided. In order to prevent maternal / mortality and morbidity, it is inevitable to develop a triage scale specific to obstetric acuity in order to ensure that health personnel are able to perform the earliest and appropriate intervention in an emergency obstetric situation or, if necessary, refer the patient to the procedure promptly. In Turkey, there is no nationally accepted classification system for the standardization of obstetric triage of patients coming to the complaint.

Methods

This study was planned with the aim of adapting the obstetric triage acuity scale to Turkish. The data of the methodological planned study was collected between 01.01.2018-30.03.2018 at the Akdeniz University in the city center of Antalya. The "Obstetric Triage Acuity Scale" (OTAS) was used for the collection of research data. Studies have been carried out on the language availability and content validity of the Obstetric Triage Acuity Scale. Statistical Package for the Social Sciences (SPSS) 20.0 software package program was used to analyze the data

obtained from the research. Permission was obtained from the Ethics Committee of the Institute of Health Sciences of the Akdeniz University before the research started.

Otas

Obstetrical Triage Acuity Scale, a five-category (1-resuscitative, 2-emergent, 3-urgent, 4-less urgent, 5-nonurgent) triage acuity scale with a complete set of obstetrical determinants. The scale consists of triage-focused segments of the patient's assessment time, medical complications, and complaints of obstetric determinants (Smithson et al., 2013). In 2016, the National Triage Working Group finalized OTAS with the addition of substance use and mental health assessment. Gratton et al. (2016) added the final chapter with the aim of supporting the determination of the urgency level of the assessors. The last section included the haemodynamic status of the patient (shock), respiratory stress, fetal evaluation (fetal heart rate, meconium in the amnion fluid) and cervical dilatation evaluation (Gratton et al., 2016). In the original scale, kappa was found to be OTAS 1-4 0.61-0.77 and OTAS 5 0.87 (Smithson et al., 2013).

Results

Language Validity

After the Turkish translation of the Obstetric Triage Emergency Scale was made by the researcher, the scale was translated from English to Turkish by three teaching staff who knew two languages (English / Turkish). After the translations were organized by the researcher and consultant lecturer, Scale Turkish form was created. The "blind back translation" method was used in the scale language adaptation. The translation of the scales into English was done by a lecturer at the Faculty of Foreign Languages of Akdeniz University. After the translation work done, the scale was sent to the author. The necessary corrections have been made in the direction of the suggestions coming from the author and the scale has been finalized.

Internal validity

Expert opinion has been referred to evaluate the internal validity of OTAS. The Turkish form of the completed scale was requested from 8 faculty members who were experts in the field. In evaluating the expert opinion, the Content Validity Index was used. The content validity index was used in the evaluation of expert opinions. The evaluation of the validity of this index, developed in 1983 by Waltz and Bausell is made in the form of 4 likert type. In Likert 1, "very change is necessary" (2) "little change is required" (3) "appropriate", 4 "very appropriate" (Polit and Beck, 2006). The descriptive statistics of the scores given by the experts to each item of the scale are presented in Table 1. In this table, it is seen that the average scores of the expert points are between 3-4, and the minimum values are between 2 and 4 and the maximum values are all 4.

Table 1. Descriptive statistics of the scores of the experts

	N	Ort.	Ss	Min.	Max
S1	8	3.7500	.46291	3.00	4.00
S2	8	4.0000	.00000	4.00	4.00
S3	8	3.7500	.46291	3.00	4.00
S4	8	3.8750	.35355	3.00	4.00
S5	8	3.1250	.35355	3.00	4.00
S6	8	3.6250	.51755	3.00	4.00
S7	8	3.7500	.46291	3.00	4.00
S8	8	3.3750	.51755	3.00	4.00
S9	8	3.7500	.46291	3.00	4.00
S10	8	3.1250	.64087	2.00	4.00
S11	8	3.3750	.51755	3.00	4.00
S12	8	3.7500	.46291	3.00	4.00
S13	8	3.6250	.51755	3.00	4.00
S14	8	3.2500	.70711	2.00	4.00
S15	8	3.5000	.53452	3.00	4.00
S16	8	3.3750	.74402	2.00	4.00
S17	8	3.8750	.35355	3.00	4.00
S18	8	3.8750	.35355	3.00	4.00
S19	8	3.5000	.53452	3.00	4.00
S20	8	4.0000	.00000	4.00	4.00
S21	8	3.6250	.51755	3.00	4.00
S22	8	3.5000	.53452	3.00	4.00

Content validity index; substance validity index and for the whole scale. The item content index is found by dividing the number of experts who score 3 or 4 points for each item by the total number of experts. If there are 6

or more experts, it means that the item content index (I-CVI) is 0.78 and above, and that the scale has excellent article content validity (Polit and Beck, 2006). The language expression content index for this study is 0.983 and it can be said that it has a very high content content validity.

Scale content validity index; is calculated by dividing the number of items given by 3 or 4 points for each expert by the total number of items. In the content analysis of the scale, the scale content validity index (S-CVI) can be accepted between 0.80-0.90 and it can be said that the scales having 0.90 and above have excellent content validity (Polit and Beck, 2006). In this study, the scale content index is 0.8636 in terms of language expression and our scale has the content validity of a scale close to perfection.

In addition to the average scores of the experts in the survey, the suggestion of the expression style and content of the items was also evaluated. In line with the views and suggestions of the Prime Minister, 1., 4., 5., and 14th items have been rearranged, the scales have been finalized with various additions / subtractions to provide semantic integrity and on-the-ground reliability.

Conclusion

As a result, the language expression content index for this study is 0.983, it has a very high content content validity, and the scale content index is 0.8636 in terms of language expression, and our scale has a content validity close to perfection.

References

- AWHONN. (2016). Maternal fetal triage index. Retrieved from <https://www.awhonn.org/?page=MFTI>
- Bullard MJ, Unger B, Spence J, Grafstein E. Revisions to the Canadian Emergency Department Triage and Acuity Scale (CTAS) adult guidelines. *CJEM* 2008;10(2):136e51.
- DePaoli, W. (2016). Obstetric Triage Improvement. <https://repository.usfca.edu/cgi/viewcontent.cgi?article=1326&context=capstone>
- Eitel DR, Travers DA, Rosenau AM, Gilboy N, Wuerz RC. The emergency severity index triage algorithm version 2 is reliable and valid. *Acad Emerg Med* 2003;10(10):1070e80.
- Evans M. K., Watts N. and Gratton R. (2015). Women's Satisfaction With Obstetric Triage Services. *JOGNN*, 44, 693-700; 2015. DOI: 10.1111/1552-6909.12759
- Gratton RJ., Bazaracai N., Cameron I., Watts N., Brayman C., Hancock G., Twohey R., Alshanteer S., Ryder JE., Basso M., Smithson DS. (2016). Acuity Assessment in Obstetrical Triage. *Journal Obstet Gynaecol Can*, 38(2):125-133
- Mackway-Jones K. *Emergency triage: Manchester Triage Group*. London: BMJ Publishing Group; 1997.
- Smithson DS., Twohey R., Rice T., Watts N., Fernandes CM., Gratton RJ. (2013). Implementing an obstetric triage acuity scale: interrater reliability and patient flow analysis. *American Journal of Obstetric&Gynecology*, <http://dx.doi.org/10.1016/j.ajog.2013>
- Polit, D. F., & Beck, C. T. (2006). The content validity index: Are you sure you know what's being reported? Critique and recommendations. *Research in Nursing & Health*, 29, 489-497.

On The Complementarity Between Physical And Digital Models In Designing Origami-Inspired Structures

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Abstract

In terms of design education, origami has been adopted as an effective medium for morphological explorations. In origami-inspired design, numerous translations between the physical and digital models are unavoidable for the feedback loop. However, repeating the translation is highly time-consuming so that the feedback loop tends to slow down. This study proposes a complementary form-finding process between physical and digital models in the design of origami-inspired structures by combining 3D scanning, parametric modeling, and augmented reality technology. Generating digital models through 3D scanning substitutes for digital modeling with mouse and keyboard. After going through a series of performance analysis and optimization, digital models can be compared with the physical models with the aid of an AR tool. The process facilitates physical properties of physical and digital models complementarily. It was applied to the initial design stage of the pavilion.

Introduction

Origami, the art of paper folding, is the technique of creating three-dimensional objects from two-dimensional sheets (Megahed, 2017). Based on the geometric pattern relations, it has been used to develop various engineering and design applications. This wide range of applications, from expandable medical stents to folding satellite antenna, has been named as 'Origamics' demonstrating the interdisciplinary nature including mathematics, engineering, and biology (Steward, 2007). Quite a few architects have been inspired by its stability and flexibility. Its mesh network works as a structural system, and its folding mechanism provides architecture with responsiveness beyond a conventional concept of static space.

Origami-inspired design needs a transdisciplinary approach including mathematics and physics to solve the problem of structure, function, and aesthetics. In terms of design education, origami has been adopted as an effective medium for morphological explorations. By algorithms based on mathematical or physical principles, physical origamis can be represented as digital origamis for parametric design with geometrical accuracy. Although current descriptive geometrical modeling is emerging rapidly, there is a limitation of the representation of materiality in the virtual environment. Furthermore, physics simulation leads to heavy loads of computing resources and delay of calculating time, so the real-time interaction between a designer and the design medium is disturbed. The physical model can be used complementarily because it is very beneficial for feeling and touching in exploring principles of form, morphology, and structure. Designers can take a strategy using physical models for exploring initial ideas fast and then digital models for developing them (Oxman, 2008).

Compared with traditional paper-based design, a distinguishing feature of the digital design is that it allows for a form-finding process through numerous iterations between generation and simulation. In origami-inspired design, a number of translations between the physical and digital models are unavoidable for the feedback loop. However, repeating the translation is so time-consuming that the feedback loop slows down. In addition, the continuity of design media is not maintained because there is a big difference between the actions of folding papers and digital modeling with keyboard and mouse. As a result, designers cannot test various design alternatives during the early design phase. Thus, there is the need of the form-finding process maximizing the availability of physical models while reducing its representation-redundancy.

This paper aims at investigating a form-finding process characterized by the complementarity between physical and digital models in designing origami-inspired structures. Physical computing technologies such as 3D scanning and augmented reality enable the translation between physical and digital models without the designers' intervention. Generating digital models through 3D scanning means that the action of folding papers substitutes for digital modeling. After going through a series of performance analysis and optimization, digital models can be compared with the physical models through augmented reality.

In chapter 2, the concept of design media, digital design process, and tangible user interface are explained in the context of origami-inspired design. In chapter 3, the critical tools including 3D scanning, parametric modeling, augmented reality are utilized in the design process. Each application operates its process, but the data structure should be modified to ensure the continuity of dataflow. In chapter 4, the design process was applied to the pavilion design, and the educational effectiveness was observed and discussed.

In most cases, a point cloud from 3D scanning is directly converted into a mesh for representing a physical object. The mesh is too complicated to be controlled because it is composed of the excessive amount of points. This paper proposes a series of mesh editing process including mesh reduction, data sorting, and partitioning for generating a simple parametric mesh proper to form-finding.

This research focuses on the initial design stage to test the potentials of the various origami patterns. A physical model in this research means just an origami made of a piece of paper. Although the design process does not deal with scale models with specific building components, its digital models are represented as detailed models with the support of building information modeling.

Backgrounds

2.1 Design media: Origami

Without having the actual object at hand, the designer needs a medium to develop and represent his/her formative idea (Gänshirt, 2007). Design activity is highly effected by visuospatial modeling media, so the design ability to adopt a strategy depends on them (Cross, 1990). Design media have direct and essential impacts in the way architecture is conceived, developed and communicated (Bermudez & King, 2000).

Architectural design media are categorized by various standards: verbal vs. non-verbal (visual), physical vs. digital, or two-dimensional vs. three-dimensional. However, considering the three-dimensional and model-based method of designing (Garber, 2014), physical and digital models are duumvirate of the design process virtually constructing buildings.

Physical models had been the most effective traditional design media even before a perspective appeared in Renaissance. Physical models, which are handmade, manual, and material, is useful to understand the structural system, space, and form. Digital models, which are electronic, computer-aided, or virtual, support designers with higher levels of geometrical definition and abstraction. During the design process, designers do not use only one or the other but alternate both of them. Many media iterations help designers grasp the difference between physical and digital models and therefore lead to the maximum exploitation (Bermudez & King, 2000).

In origami-inspired design, origami can be represented not only as physical and but also as digital models. Physical origamis actively enhance hand-eye coordination, which in turn positively influences and develops a better sense of spatial perception (Megahed, 2017). In the earliest form of architectural education, Joseph Albers in Bauhaus used paper folding to help his students discover the relationships between materiality, geometry, and structure. Recently due to the advance in parametric design and digital fabrication technologies, students can make use of interactive digital tools to solve various architectural design issues from structure to detail. Digital origamis are controlled by parameters and unfolded into planar figures for laser-cutting.

2.2 Digital design process

Advances in BIM (Building Information Modeling) transform the digital design process from the traditional paper-based design process. The role of digital models, which was limited to representation, now extends to generation and virtualization. The origami-inspired design also needs to adopt the concept of the digital design process from an educational standpoint. It means that it is vital to develop the curriculum and design media for students to understand the digital design process.

BIM supports performance-oriented design which building performance is a guiding design principle. From the early design stage, the multiple different performances are considered simultaneously by close collaboration among the stakeholders (Kolarevic, & Malkawi, 2005). When simulation and optimization are combined, form-finding is possible for the optimal alternative. The performance-oriented design helps designers overcome the limitation of traditional architectural design and delivery process: linear procedure and minimized time for design (Garber, 2014). Now architectural students require the capabilities to integrate various building performances through operating simulation programs or collaborating with experts.

2.3 Tangible User Interface

Most of CAAD (Computer Aided Architectural Design) programs rely on GUI (Graphic User Interface) which is a standard paradigm of HCI (Human-Computer Interaction) with a mouse-driven cursor and multiple windows. The “See, point, and click” interaction of GUI replaced for the “Remember and type” interaction of CUI (Command User Interface). Advanced modeling techniques such as polygon modeling and NURBS (Non-Uniform Rational B-Spline) extended the possibility of GUI as design media.

However, hand-eye coordination is tacit knowledge which is not easy to learn. Designers embody the operating principles inherent in individual modeling techniques and reorganize the body sensations through trials and errors (Park, 2009). Considering educational practices, it is hard to teach the theoretical backgrounds for digital design and techniques operating a certain software for a limited time. Furthermore, in designing origami-inspired structures, especially, the hand-eye coordination of GUI and folding papers are very different.

TUI (Tangible User Interface) has been researched to bridge the gap between physical and digital worlds. To

facilitate human haptic perceptions, physical objects or hand motions are used for substitutes of keyboards and mouse which are input devices of GUI. To enhance spatial cognition, AR (Augmented reality) mixes reality with virtual reality instead of just projecting on flat monitors. Since John Frazer's Universal Constructor in the early 1990s, TUI researchers has invented various tabletop applications for architecture, landscape, and urban planning.

The educational impact of TUIs as design media also has been investigated. Compared with GUI, TUI activates their spatial reasoning and collaboration far more because it reduces designers' cognitive load through seamless interactions between human and computer (Kim & Maher, 2008). However, no specific research has been undertaken on TUIs for origami-inspired design.

Methodology

The methodology works as a kind of design interface that allows designers to input physical origamis and obtain BIM with optimized shapes. It consists of a combination of 3D scanning, parametric modeling, and augmented reality as shown in [Figure 1]. To ensure the continuity of the data flow, it needs to be processed into the data format required by each process. The data formats used in this process are as follows: 1) 3D scanning: from point cloud to mesh 2) Parametric modeling: from complex mesh to simple parametric mesh and BIM 3) AR: mesh or BIM.

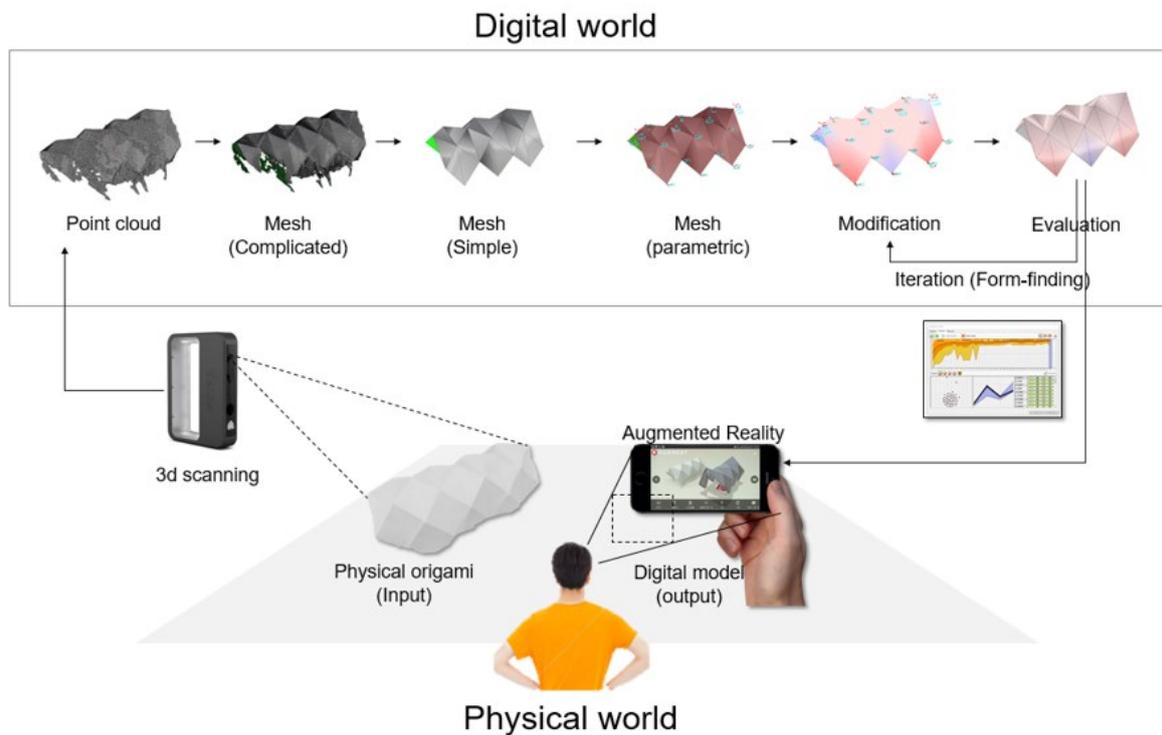


Figure 1: A dataflow diagram between physical and digital model

3.1 3D scanning: From physical to digital

The form of a physical origami, an initial input of the process, is digitized using a non-contact active scanner considering its weakness. It emits radiation or light, detects the reflection and generates a point cloud in virtual space. The form cannot be probed at once by one 3D scanner with a cone-like field of view, so multiple point clouds from different viewpoints are integrated.

3.2 Parametric modeling

A polygon mesh is generated from point clouds through Delaunay triangulation which is a mathematical way of joining a set of points to make a triangular mesh. It is scaled up to a real structure, and the unnecessary mesh faces are removed by manual selection. It is accurate to the form of the physical origami geometrically but has far more mesh faces than those of the physical origami. It needs to be simplified and parameterized to get simple parametric mesh proper to form-finding as shown in [Figure 2].

(1) Mesh simplification

Mesh reduction algorithm is used to simplify the complex mesh while preserving its overall shape. The mesh faces are reduced until the digital origami has the same number of mesh faces with the physical origami. However, this technique is applicable only to the origami which consists of triangle meshes.

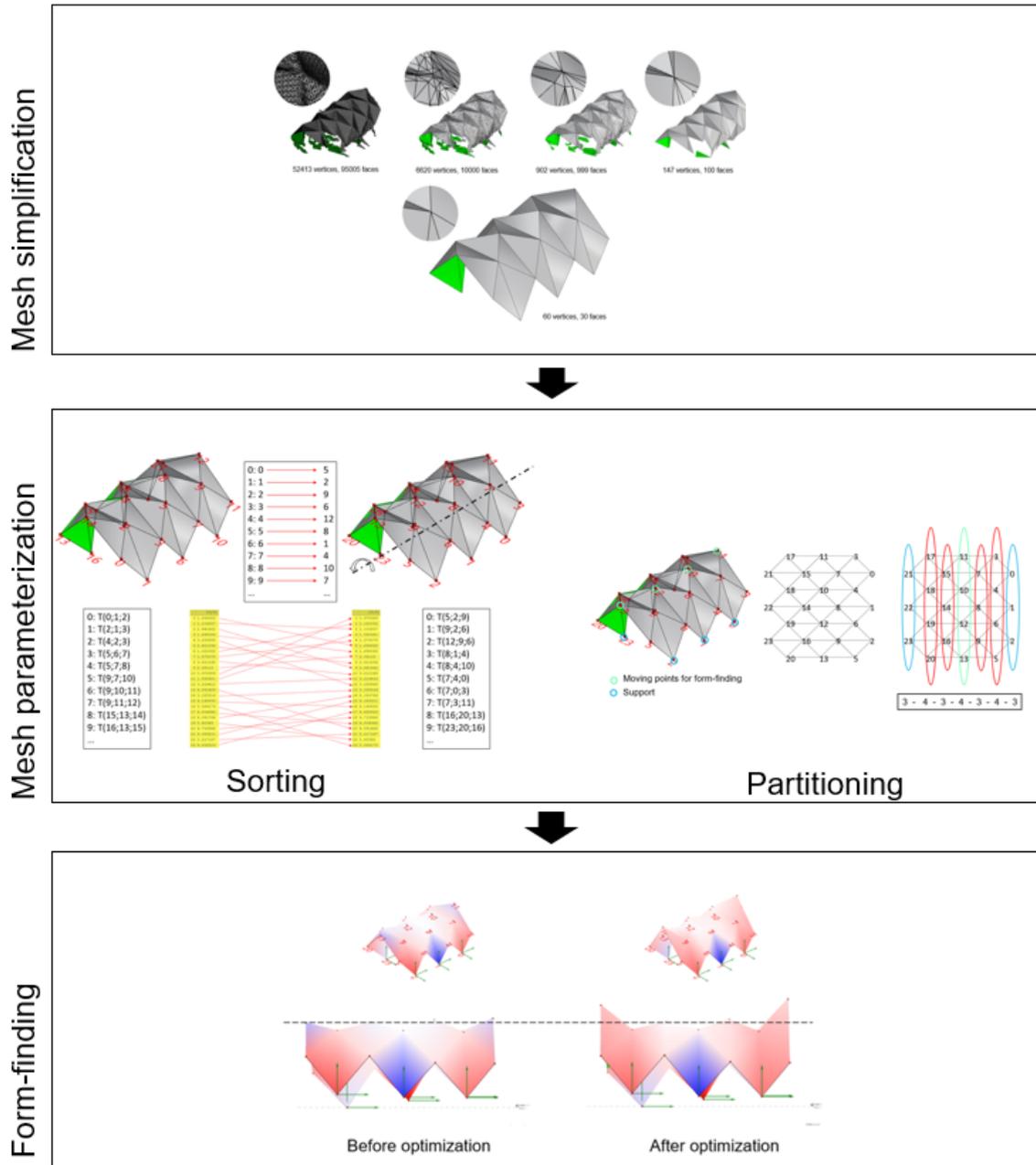


Figure 2: Parametric modeling process: Mesh simplification, parameterization, and form-finding

(2) Mesh parameterization

A polygon mesh is transformed by editing its mesh points. However, the data order of the mesh points is determined during the previous steps including 3D scanning and mesh simplification. For utilizing the mesh as a parametric model which is transformed by parameters, the data order of the mesh points should be rearranged and grouped regarding its structural system.

Using Stable sorting algorithm which maintains the relative order of records with equal keys (i.e., values), the data order is rearranged according to the numerical order of the location of mesh points. Each mesh needs its ranking way of the numerical order according to its topology. Every mesh face consists of a set of three vertices connected to others and represented like $T \{1, 7, 4\}$. They should be updated by reflecting the new data order of sorted points to maintain the same form of the mesh.

To classify the mesh points individually by their structural roles, the number of points corresponding to the origami pattern is input and used to partition the list into sub-lists. Some mesh points touching the ground serve as supports and others are selected as movable points for form-finding.

(3) Form-finding

Designers can find the optimal form from the numerous alternatives generated by changing the position of the mesh points or the properties of mesh faces. When mesh points, edges, and faces are replaced by specific building

components such as columns, beams, and windows, more detailed and various performances are analyzed as well as structural analysis.

3.3 Augmented reality: From digital to physical

Using AR application of a smartphone, the physical origami as an initial input is compared with the digital origami which offers more capabilities and realistic appearances in the same space. A designer moves and rotates the digital origami through moving tracking marker or touching screens.

Experiment

The methodology proposed in the previous chapter was applied to the initial design stage of the pavilion. The origamis used in the experiment were limited to triangle meshes and made of A4 paper. Three cases were used in the experiments as shown in [Figure 3].

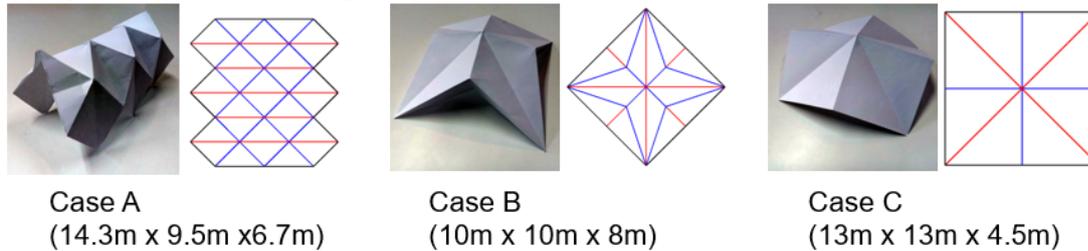


Figure 3: Three design cases used in the experiments

In the course of parameterizing the meshes, all three cases needed the different coordinate systems for sorting and grouping pattern regarding the structural systems. In case of A, the coordinates were reoriented to the polar coordinate system and (3-4-3-4-3-4-3) grouping pattern. In Case of B, the z coordinates of the mesh points were used and (4-4-1) grouping pattern. In Case of C, the z coordinates of the mesh points were used and (4-4-4-1) grouping pattern.

A key performance for form-finding was its structural stability. The purpose of the optimization was to minimize the displacement caused by the gravity, and the method was GA (Genetic Algorithm). The hardware devices and software programs used in each step are as shown in [Figure 4].

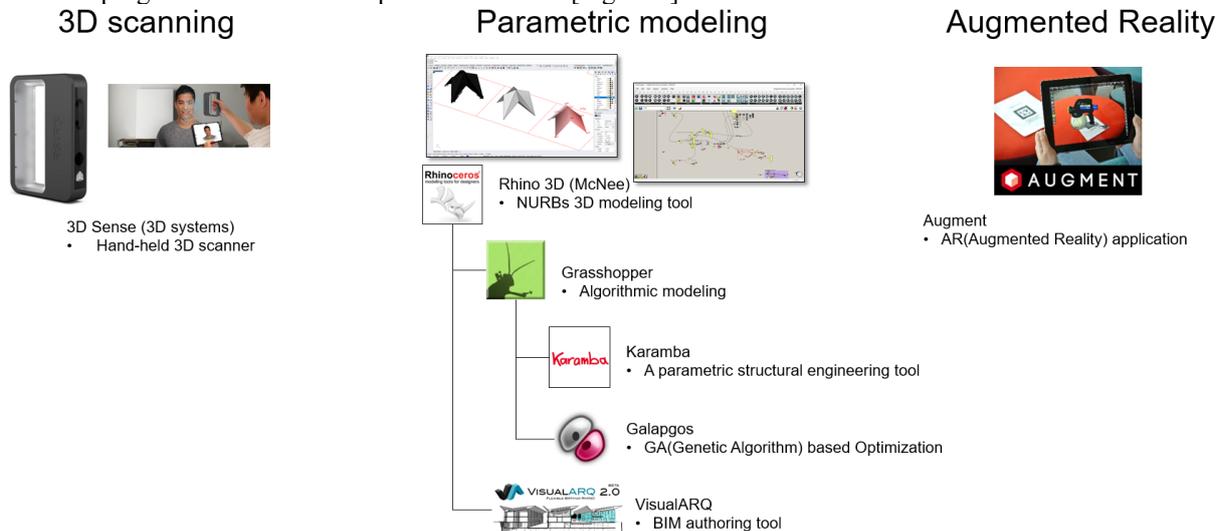


Figure 4: Hardware devices and software programs used in the experiments

Results

All the cases were structurally optimized and developed into the detailed building information models as shown in [Figure 5]. For form-finding, designers selected the moving points and their ranges considering their design intention and requirements. The maximum displacements of all the cases were reduced, but the reduced amounts varied from case to case.

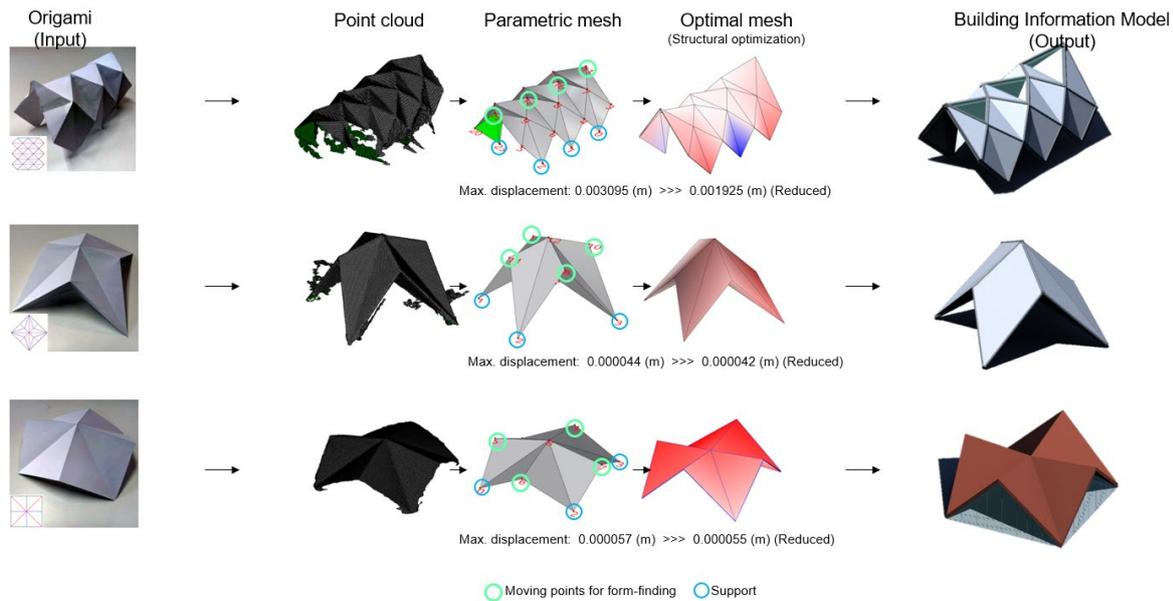


Figure 5: The results of the experiments

Findings

A physical origami is not strong enough to show its structural stability. However, it provides the topology of the structure which digital model can utilize for form-finding with virtual materiality. It is difficult to specify the direction and scope of optimization using only digital models without physical models. Physical origamis help designers understand the structural system of an origami and select points to optimize. In other words, a physical origami provides the topology of a structure, and a digital model can examine the structural possibilities on a building scale by reflecting virtual materiality.

Conclusion

This study proposes a complementary form-finding process between physical and digital models in the design of origami structures by combining 3D scanning, parametric modeling, and AR technology. The process facilitates physical properties of physical and digital models complementarily. Without designers' intervention, physical origamis were translated into digital origamis, optimized structurally and represented as specific building information models.

This paper has some limitations and necessitates future works. First, in terms of parametric modeling, the process needs to adopt the algorithm simplifying other polygon meshes. Second, in terms of performance-oriented design, the multi-criteria optimization including some environmental issues is the next step of this research. Third, in an educational sense, the methodology with real-time interactions is needed to research which designers learn tacit knowledge about the structural system.

Acknowledgement

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References

- Bermudez, J., & King, K. (2000). Media interaction and design process: Establishing a knowledge base. *Automation in Construction*, 9(1), 37-56.
- Cross, N. (1990). The nature and nurture of design ability. *Design studies*, 11(3), 127-140.
- Gänshirt, C. (2007). *Tools for ideas: Introduction to architectural design*. Walter de Gruyter.
- Garber, R. (2014). *BIM Design: Realising the Creative Potential of Building Information Modelling*. John Wiley & Sons.
- Kim, M. J., & Maher, M. L. (2008). The impact of tangible user interfaces on spatial cognition during collaborative design. *Design Studies*, 29(3), 222-253.
- Kolarevic, B., & Malkawi, A. (2005). *Performative Architecture: Beyond Instrumentality*. Routledge.
- Megahed, N. A. (2017). Origami Folding and its Potential for Architecture Students. *The Design Journal*, 20(2), 279-297.
- Oxman, R. (2008). Digital architecture as a challenge for design pedagogy: theory, knowledge, models and medium. *Design Studies*, 29(2), 99-120.
- Park, H. (2009). *Interface-Chronology: human, design and technology*. Design flux.
- Stewart, I. (2007). Mathematics: some assembly needed. *Nature*, 448(7152), 419.

Online Assignments In Mathematics Courses At University

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Abstract

Teaching mathematics courses has undergone substantial changes in the past decade. From blackboard and piece of chalk to use of I-clickers and online learning management systems, modern technology has made its way in teaching undergraduate mathematics courses. Subsequently, online assignments (OA) have become an integral part of the teaching process. Many researchers have studied pros and cons of OA if compared with standard handwritten assignments. In addition, administrators, faculty, and students have noted that both types have distinctive positive characteristics but the advantage is still not clear when used in mathematics intensive courses. In this study, the overview of advantages and disadvantages of OA based on the literature review and recent developments in the use of OA in the Department of Mathematics at SFU (Department) are presented along with a personal experience in teaching various undergraduate mathematics courses with online assignments utilizing the online resources from leading publishers.

The Study

In the past five years, the author has used OA based on the following online platforms: LonCapa (Michigan State University), WileyPlus (Wiley), WebAssign (Cengage), and MathXL (Pearson) when teaching various Calculus II and I courses as well as the Introductory Course on Ordinary Differential Equations.

A detailed literature review with analysis of pros and cons of OA can be found in Penner, Kreuze, Langsam, and Kreuze (2016), Junjic, Kent, and Menz (2012), and Malevich (2011).

Based on the author's personal experience and incorporating some of the findings from above literature review it appears that pros and cons of OA can be briefly summarized as follows.

Advantages of OA:

- OA save university funds if compared with marking handwritten assignments;

In the Fall semester each academic year about 3500 students are taking first and second year service mathematics courses taught in the Department. The cost of marking 10 assignments per student per semester (only limited number of problems are being marked!) can be estimated as exceeding \$20,000. While pedagogically sound, handwritten assignments are costly.

- All problems in OA are marked versus only 2 selected problems currently being marked in hand-written assignments for service courses in the Department;

Students get often frustrated as they spend many hours solving 15-20 assigned problems and putting down their reasonably well presented solutions on numerous pages while only two problems are typically being marked. Some credit is still given for completing the assignments (about 20% of the overall mark) though. OA allow marking all assigned problems what leads to a positive student feedback.

- OA questions are randomized;

"Pirate copies" of major textbook solution manuals are readily available on internet. Introducing OA may eliminate cheating as the coefficients in the equations vary and depending on available randomization (differs for various platforms) only limited number of students may get the identical values if any.

- All major publishers are moving towards online textbooks and accompanying OA;

Depending on the publisher, the cost of OA may be included in the package with online textbook (Wiley and Cengage), if not – the cost for a standalone OA can be negotiated between the institution and the publisher (Pearson). In addition, financial assistance is available from the publishers for low-income students, as we have discussed with them.

- OA are appealing to the students to make mathematics "less boring";

Many courses in other disciplines at SFU are now computer-based. On average, majority of students in mathematics service courses are not particularly interested in mathematics and find it boring. OA facilitate the use of technology and appeal to the students.

- Provide the instructor with quick analysis which concepts/techniques were or were not learned well by the class; Quick detailed feedback on class performance is extremely helpful in teaching large service classes (150-500 students). It allows the instructor address problematic parts of class material before it interferes with subsequent learning and major tests.
- Provide good drill practice to the students with immediate feedback; OA allow for instantaneous assessment as opposed to a standard weeklong turnaround in case of paper assignments when the students have already little interest. In addition, for training purposes, multiple attempts are quite useful.
- Help students manage their time better, take up responsibility; In the survey, many students have noted that OA supported them in developing better time management habits. In my classes, weekly OA were due at 10pm, when no help is available. Students had to learn to start the assignments in advance, to be able to use the instructor's or TA's help during the office hours.

Disadvantages of OA:

- Cost for the students; Some sequences of courses may use the same (online) textbook and/or OA platform, e.g. Calculus I / II / III (MATH-151/152/251). When negotiating with the publishers, the Department is always ensuring that the access pass would cover all semesters required to complete the sequence plus at least one extra semester (in case of failure or personal matters). Still, some students may take longer to complete all courses covered by the deal with the publisher. Also, in case of standalone OA (no textbook) students encounter extra cost if compared with handwritten assignments.
- Require more time on instructor's side; Currently, there are five different OA platforms used in the Department. Learning various platforms and operating OA in courses that are using different platforms simultaneously is a challenging task. In addition, dealing with student real and perceived complaints in numerous e-mails ("I solved it right but it does not accept my answer", "no internet", "servers were overloaded", etc.), changing their grades is extremely time consuming and can easily go over 20 hours per week.
- Imperfect coding:
 - Not enough randomizations, students still cheat by forming "study" groups and taking turns in submitting answers with multiple tries.
 - Programming bugs are not rare when a correct symbolic answer is not accepted without explanations.
 - Correct symbolic answer may not be recognized because of simplification or lack thereof, when for example, student answers of $1/\sqrt{2}$ or $\sec^2 \theta / (3 \sec^2 \theta)$ were recognized as wrong.
 - Minor mistakes in syntax (which differs for each platform and can be readily confused by the students if they are simultaneously taking courses with different platforms) are recognized as a wrong answer.
 - Often, only the final answer is marked, no partial marks are given. This causes a lot frustration when a student has to carry out a page-long solution and makes a small typo along the road; paper assignment would have recognized it and given a high partial mark instead.
- Simplified pedagogical approach:
 - Mainly "drill and practice" type questions versus open-end problems.
 - Limited number of attempted "conceptual" type questions are watered down by excessive steps/explanations and templates. It may give students too much structure, thereby promoting rote learning and precluding learning of the concepts behind problem solving.
 - Many platforms offer hints and referral to exact place in the textbook or even offer a solved similar example what is good for studying/tutoring purpose but is not sufficient to be considered an assessment tool of acquired knowledge.
 - Many drill questions (e.g. when finding derivatives or evaluating integrals) can be often done using the graphing calculator, Wolfram Alpha, Maple/Mathematica/Mathlab, or other analytical mathematics software thus allowing cheating on these questions.
 - Excessive number of T/F and/or multiple choice questions may lead to trial-and-error strategy rather than learning and solving and give the students false sense of security, later resulting in low quiz/test marks.
 - Questions of the sort "Match the correct graph" instead of "draw a graph" questions send a wrong message to the students who may not get enough understanding and preparation for the hand-written tests. "In general, I think it is very important for the homework to reflect the caliber of work that is expected of students on quizzes and exams in the course. If students are not practicing and being reminded of how to use proper mathematical notation on a regular basis, then they will more than likely do a poor job of this on

quizzes and exams. I feel that it is unfair to students in courses that use only online homework, written exams, and no quizzes for students to get penalized on the written exams because the homework does not require them to show any of their work.” (Malevich, 2011, p.16).

Findings

I will present the results of online survey of the students in Calculus II for the Biological Sciences course MATH-155 (Spring 2018) carried out at the end of the semester. Usually, that the students in this class have strong working ethics. They are determined to succeed as many of the students intend to join a medical school after getting their undergraduate science degree. Out of 108 students registered in the class, 99 students filled in the survey. Class average was a “C”-grade (GPA of 2) what corresponded to 55-59%. This course does not use any official textbook. The OA were created using the MathXL platform by Pearson publishing house. As it is shown in Figure 1, 95% of the responders were convinced that OA were useful and helpful in mastering the course material even despite all glitches with software and multiple requests for remarking.

Online assignments helped me master the content of the course

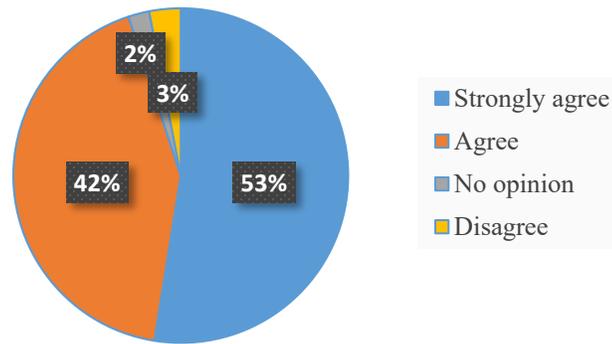


Figure 1

Online Survey Results on Usefulness of Online Assignments in Mastering the Course Content

The platform has a feature of providing the students with a solved hint example similar to the one they are solving. About 40% of the students found this feature helpful while 45% strongly agreed and agreed that it made the assignments too easy (Figure 2).

It was interesting to know the opinion of the students whether paper assignments would have been more efficient than OA (Figure 3). Here the class opinions were seriously split. The group of the weaker students favoured paper assignments: 35% strongly agreed (average “C-“, failure rate: 32.35%) and 18% agreed (average “C”, failure rate: 22.22%) that paper assignments would have been more helpful. At the same time, the stronger students (average “C+”, failure rate: 17.24%) clearly preferred OA. It is possible that the stronger students were better organized and could work on their assignments in advance, not leaving them to the night deadline. The weaker students may have liked paper assignments more because they would be still easier to cheat. This question needs to be studied more.

The average semester grade of the students in OA was 90.4% what is much higher than in case of paper assignments. This situation was observed in the previous classes as well. Since these abnormally high grades do not provide the students with true feedback on their current knowledge, I typically include quizzes in the class-marking scheme. While this class average on quizzes was much lower, only 46.26%, 52% of the students strongly agreed and 31% agreed that

In online assignments, using the solved "hint" example, made the assignments too easy

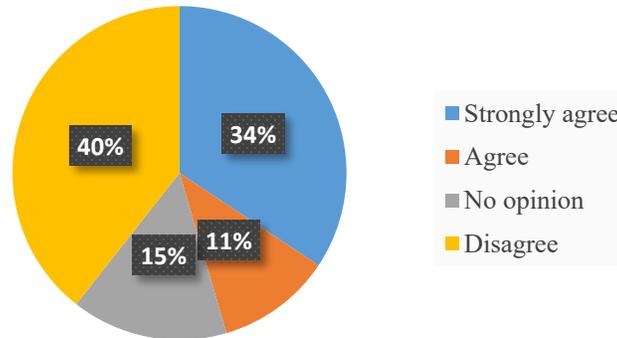


Figure 2
Online Survey Results on Usefulness of “Hint” Examples Provided by the Publisher

Paper assignments would have helped me better than online assignments, to master the course content

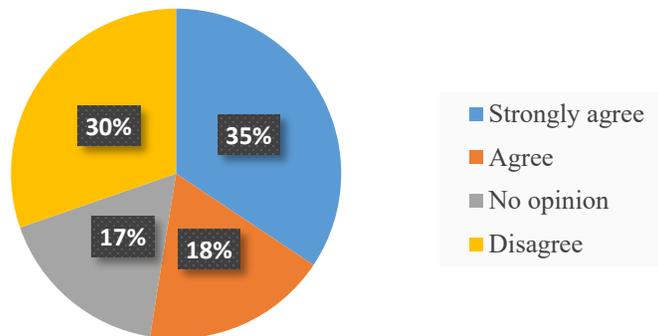


Figure 3
Online Survey Results on Usefulness of Online Assignments versus Paper Assignments quizzes were useful. Only a small group (4% of the respondents) disliked the quizzes, with three students among them failing the course (Figure 4). When studying the relationship between the overall course grades and quiz averages (Figure 5) it becomes clear that quizzes are reasonably good predictors of failure or success in the course.

Quizzes were helpful to master the class material

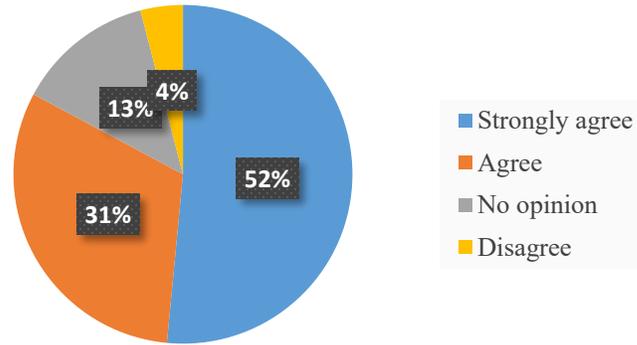


Figure 4
Online Survey Results on Usefulness of Weekly Quizzes

Quizzes vs course grade in MATH-155

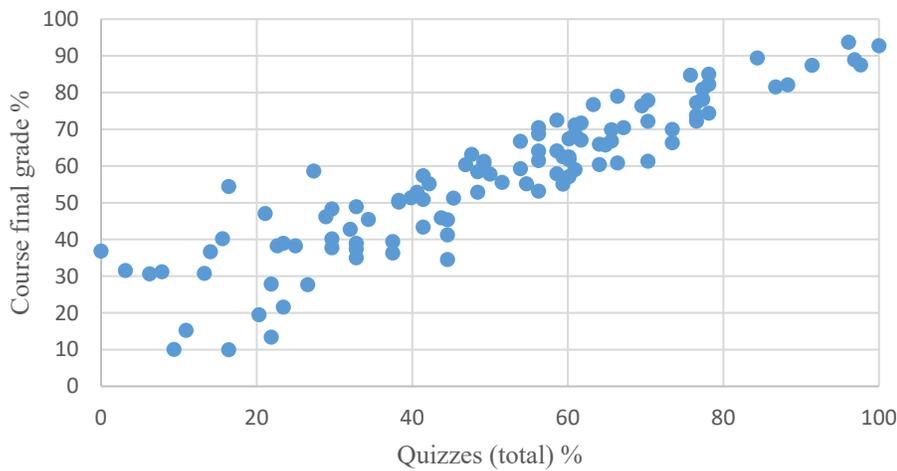


Figure 5
Relationship between Average Quiz Results and Overall Course Grades in the Course

Conclusions

In lower division undergraduate service mathematics classes OA can be viewed as a useful quick assessment and tutoring tool. At the same time, OA are lacking sophistication and challenges if compared with the problems on the serious tests. Therefore, OA should be used together with hand-written assignments and quizzes, in order to give students an experience of writing mathematics, in particular with proofs, what will be tested later during the midterm tests and on the final exams.

References

Jungic, V., Kent, D., & Menz, P. (2012). On online assignments in calculus class, *Journal of University Teaching & Learning Practice*, 9(1). [On-line]. Available: <http://ro.uow.edu.au/jutlp/vol9/iss1/3/>.

Malevich, K. (2011). *The Accuracy and Validity of Online Homework Systems*. MSc Thesis, Department of Mathematics and Statistics University of Minnesota Duluth. [On-line] Available: http://www.d.umn.edu/math/Technical%20Reports/Technical%20Reports%202007-TR%202011/TR_2011_2.pdf

Penner, J., Kreuze, E., Langsam, S., & Kreuze, J. (2016). Online homework versus pen and pencil homework: do the

benefits outweigh the costs? [On-line]. Available:
<http://www.wiu.edu/cbt/jebi/documents/NAASFeb2016/SpecialNAASIssueFeb2016-OnlineHomeworkVsPenAndPencilHomework.pdf>

Open And Closed Problems: A Comparison

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Abstract

This article recalls the definitions of open and closed problems in mathematics on the background of the historical course of implementing closed problems in Czech schools and their current role in the system. The main part of the study compares the positive and negative aspects of applying open and closed (with emphasis on multiple-choice) problems in the teaching and learning of mathematics. These aspects can be traced in other school subjects as well. The ideas presented here are based on four investigations – one conducted in the Slovak Republic, two others in the Czech Republic about ten years ago and, finally, on the results of a master's thesis work of the my student, and on my own long-term experience in creating problems of both types in the Czech Republic and abroad. I also include my personal view of the advantages and disadvantages involved in the use of these problems.

Keywords: *Open problem, closed problem, mathematics problem posing*

Introduction

This contribution deals with so-called open and closed problems. For detailed examples of problem classification, the reader is referred to the work of Byčkovský and Zvára (2007, pp. 16–22), Cihlár et al. (2007, pp. 7–8), and Zhouf (2010, pp. 28–29). Here, I will only take into account two of the many problem types, namely closed *multiple-choice problems*, and *open problems with an extensive answer*.

The main aim of the article is to point out those characteristics that distinguish one type from the other as well as those that they share. In the conclusion, I will further stress the inter-changeability of these two types of problems and, above all, the utility of closed problems. The reason for the latter argument can be found in the fact that closed problems are generally not perceived as quality problems by the Czech society. Such attitudes are also explained in the following text.

The methodology of the research lies in comparing pupils' written solutions to mathematical problems that were presented first in their open form and then in their closed form.

A Short History Of Multiple-Choice Problem Usage

In the book (Zhouf, 2010, pp. 29–30), there is described a short history of multiple-choice problems in the Czech Republic. While open problems have been always used in the Czech education system, multiple-choice problems have entered the scene in the Czech Republic only recently. Nonetheless, they are currently turning into a common tool for both teachers and pupils. Some similar aspects are described in the article (Zhouf, 2005, pp.139–143).

Historically, open problems probably preceded the closed ones. It is hard to tell when multiple-choice problems were first implemented. Let us mention that their wider use is first noted in the last century in North America (mainly in the USA and Canada), Western Europe, Australia and elsewhere. The many editions (since 1950) of *The Contest Problem Book* with sample problems for The Annual High School Mathematics Examinations should suffice as evidence.

This rise in multiple-choice problem usage can be attributed to the International Association for Evaluation of Educational Achievement (IEA) research. Founded in Holland in the 1950's, the IEA quickly extended its activities globally. Its most notorious research project, the Third International Mathematics and Science Study (TIMSS) in 1995, was initiated by the United States and countries in Western Europe. However, it involved many participant countries, including the Czech Republic, and gave them opportunity to contribute.

In the 1990's a similar long-term investigation was designed by the OECD. The main mathematics test took place in 2003 as the now well-known Programme for International Student Assessment (PISA). Unlike the TIMSS project, PISA focuses on pupils' mathematical literacy, connecting various mathematical areas, and testing so-called significant big mathematical ideas.

Related to the above international research, a similar national test with multiple-choice questions, *Sonda MATURANT*, was conducted repeatedly in the years 1997–1999. This test evaluated the knowledge and skills of students in their last year of higher secondary education, and was considered a pilot test for a planned standardized national leaving exam (the Czech maturita).

At the same time, publications with multiple-choice problems began to appear on the Czech market. Apart from the competition test Mathematics Kangaroo, one of the first books was 'Basic school mathematics in tests' (Matematika základní školy v testech) by Burjan and Bastlová, which was published in 1999 and contained a compilation of Czech basic (K-9) mathematical content in the test form.

Advantages And Disadvantages Of Each Of The Problem Type

The 'open vs. closed problem' discussion is a relatively common phenomenon in the Czech Republic: which of the two types is more suitable for mathematics? There are orthodox open end problem devotees, there are those who favour open problems with some tolerance for closed problems in specific insignificant cases, and finally, there are those who equally value both types. The author belongs to the final group. It should be noted that there is a very small number of people who advocate closed problems purely.

The most popular argument against multiple choice problems is that they encourage thoughtless guessing, and thus they cannot serve as a measure of pupils' real knowledge and skills. One way of dealing with this issue is to give punitive points for a wrong answer. This strategy has been adopted, for example, in the Mathematics Kangaroo competition.

Many test-makers investigate such issues: among the most prominent ones is the Scio agency in the Czech Republic, and the EXAM in Slovakia. Both of these institutions provide evidence that chance answers does not influence significantly the overall result in the case of a larger sample. The results may be distorted on an individual level only, while the whole is not affected. This finding is also supported by another Czech institution, the CERMAT, in the detailed statistical analysis by Řídká (2007).

Another argument against multiple choice problems holds that they are typically only simple problems. A more serious argument is based on the notion that one trivial (e.g. numerical) error has a fatal effect on the final answer. A multiple choice test is also believed to encourage copying during the sitting sessions.

On the other hand, there are some unquestionable advantages to multiple choices. One of them is the economical factor: multiple choice tests can cover a larger amount of content and the answers are easily evaluated. In defence of these problems it needs to be said that an open problem is equally prone to the trivial error problem, as it also consists of multiple steps any of which can lead to a taker's failure to as much as continue in solving the problem, the open problem may easily become numerically unmanageable and confusing.

One of the biggest disadvantages of open problems is the subjective factor in their scoring process - not only in case of multiple scorers but also when all scoring is done by the same person. As each pupil solution may affect a scorer in a different way, where many test-takers (e.g. at a nation-wide testing) naturally necessitate a larger number of test-scorers, objectivity cannot be assured even using rubrics, sample answers, or scoring coordinators (supervisors) (Zhouf, 2010, pp. 32). In my own experience, the difference between two scorers in the case of the Czech national Mathematics Olympiad can be up to 5 points out of a 6 point maximum. How is the situation when a pupil adopts a chance guessing strategy in a multiple choice test, operating at the 20 % probability level, different from this?

The effort to objectify open problem scoring is perhaps most manifest in institutions that conduct international research in the area of mathematical literacy across various age categories. One of the latest instruments used to this end is a pre-designed coding system: open constructed-response items require marking by a trained person who implements a marking rubric that may require an element of professional judgement. Because of the potential for disagreement between markers of these items, OECD/PISA implements marker reliability studies to monitor the extent of disagreement. Experience in these types of studies shows that clear marking rubrics can be developed and reliable scores can be obtained. (OECD, 1999, pp. 53)

Currently, the scoring system in PISA is designed in the following way: each step of the solution is coded with a double-digit code; the first digit typically assigns a degree of correctness, while the second digit denotes a particular choice of solution.

It should be apparent from the above, that such a coding system is still subjective. The reason lies in the fact that a) to anticipate all the possible solutions to an open problem is not feasible, and b) different scorers can perceive a step in a solution differently.

The advantages and disadvantages of both types of problems are discussed in further detail in (Sýkora and Zhouf, 2002, pp. 111–112), or (Zhouf, 2012), or (Zhouf, 2013).

Material And Methods

In order to see how the above characteristics of open and closed mathematical problems influence pupils' solutions to the problems and thus the pupils' assessment, it is necessary to investigate the way pupils actually solve the problems. To this purpose we will look at the results of studies in which pupils solved the same problems in both forms and analyse their written solutions. I depict three such studies: one conducted by a private subject in the Slovak Republic; one conducted by a public institution in the Czech Republic; and finally, one that preceded both of these, and was conducted by a master student where I was as a supervisor.

These three investigations took place about ten years ago. In the conclusion, a more recent study is included, one that maps out the current situation amongst teachers of mathematics in the Czech Republic, especially whether they prefer an open or closed form of mathematical problems, and how those views have changed over the span of years.

Results Concerning The Advantages And Disadvantages Of Both Types Of Problems

The first research in this area was conducted -- by a private bidder EXAM -- in Slovakia during the 1999-2001 MONITOR testing. Twelve pairs of problems were incorporated into two tests: in one test as multiple choice problems, and as open problems in the other. There were several thousand of pupils who took these tests; each pupil solved problems in only one form. The results can be summarized as follows: 'A (generally accepted) assumption was confirmed that multiple choice problems are overall easier for pupils than those requiring an open answer. However, the average difference is only 10 %, a fairly low value. Many problems showed no sensitivity to the form. There were also problems that showed worse results when posed in the multiple choice form. Those are typically problems with distractors that capture typical pupil misconceptions or mistakes. In some problems the difference in success rates for both types was relatively high – pupils were 30 % or even 40 % more successful when solving multiple choice problems.' (Burjan, 2001, pp. 10)

Another study took place in the Czech Republic during the CERMAT institute testing in the current decade. In addition to studying the reliability of both open and closed problem tests, the project also focused on the reliability in the case of various kinds of open problems (extended answer, short answer) and closed problems (multiple choice, dichotomy, matching, ordering). As concluded by Řídká (2007, pp. 169): 'The CERMAT tests repeatedly confirmed that the RIR (test item with test) correlation is significantly lower for closed problems than for open problems. Among the various types of closed problems it is the multiple choice problem that has the lowest of correlation that shows the lowest correlation. The interpretation at hand is that closed problems are, among other things, less reliable than open ones.'

The adoption of a punitive point system in multiple choice problem tests is intended to prevent massive guessing. In the above mentioned study, Řídká (2007, pp. 177) assesses the situation: '...using punitive points hardly ever affects the average result of a group. Thus it is possible, for example, to evaluate which class or which school is better. Conversely, it is impossible to compare objectively two individual test takers, no matter whether they were guessing or not. Only the data representing best test takers, those who should actually have no reason to be guessing, shows a minimal error.' Similarly, Klůfa and Kaspříková (2012, pp. 202) say that 'results can be evaluated quite easily for large number of students'.

Influenced by the debate over the suitability of closed (multiple choice) problems, I supervised a master thesis student dealing with this issue. From 1998 to 2003 Kateřina, the graduate student, investigated one of the pillars of the recent curricular reforms: the national standardized leaving exam (the maturita) in mathematics. She was creating prototypes of this part of the test, and looked for differences between a problem posed in its open and closed form, working with the solutions of high-school graduates-to-be. She designed several pairs of tests (one test with open form problems, one with the same problems in a closed form), statistically analyzed the results for both common and distinguishing phenomena. The data was collected from students of several upper secondary schools: some secondary grammar schools, some engineering schools, one business school, and one pedagogical school.

There were four versions of the tests: higher level with open problems, higher level with multiple choice problems, lower (basic) level with open problems, and lower (basic) level with multiple choice problems. Each version contained 7 problems. The allocated time was 35 minutes for multiple choice tests, and 40 minutes for the open problem tests, so that the testing could be done within one teaching period. The mathematical content of these problems was chosen to reflect the official document *Catalogue of requirements for the common part of the leaving examination in mathematics in 2004* (Katalog požadavků ke společné části maturitní zkoušky z matematiky v roce 2004). Each test version was piloted with about 100 pupils.

The graduate student conducted an item analysis for each problem, and the overall assessment of each test version. She used both the pupils' solutions to open problems and the cursory notes of pupils who solved closed problems. One analysis compared the results of tests in open and closed problem forms (there was used a punitive point system). Finally, she discussed the suitability of each item for the particular version (Zhouf, 2010, pp. 321–234).

The student was not a particularly enthusiastic advocate of the use of open problems in mathematics. Her second major was in teaching English as a foreign language (EFL). She could easily imagine the benefit of multiple choice questions in that subject, but in mathematics only with difficulty. After the study she wrote: 'The results of the investigation indicate that closed problems have a higher success rate. However, the reasons for this are not always evident (see word problems and missing answers). I found out that pupils are not able to simply estimate an answer and choose from the alternatives without doing a calculation. The same solution process for both forms was frequently evident in the written data. It would seem that the test takers who had choices provided in the test would have a certain advantage, as they could use the multiple choices to check their own solutions, or to simply guess. However, the pupils' solutions do not confirm this. It is apparent that they are afraid to take a risk in guessing when they do not understand the problem. My own belief about open problem tests' higher validity has not altered. It was merely influenced by the opportunity to take a look at the pupils' solutions of closed problems.' (Sedláčková, 2003, pp. 83–84)

Rephrasing the students' statement about the suitability of closed problems, the investigation did not shake her

beliefs, though a light trace of doubt can be detected. She further concludes that pupils are reluctant to take the risk involved in guessing the answer, but that they can learn to adopt even the guessing strategy through repeated test-taking.

The last study has been in process for the past two years. In it, the author asks teachers what form of mathematical problems they prefer. The interviews are always informal, and the number of respondents is so far around 200. Quantitative analysis is not of interest here, as the main research question is whether the views on open and closed problems, presented in the introductory section of this paper, have changed globally over the span of the past ten years. The opinion that closed problems are rather inappropriate for mathematics and should be only used in special circumstances, can be still now traced explicitly amongst teachers of mathematics in the Czech Republic.

Conclusion

To conclude, I would like to present my own point of view in the matter of open vs. closed problems. I tend towards an equally extensive use of both problem types. A suitable form of a closed problem and its effective inclusion in a test enables us to discern, well and quickly, a pupil's skills and knowledge in any relevant area of mathematics in school as well as the skills and abilities of a participant in a mathematical competition. This is more significant in diagnostics of a group sample but often also in individual cases. I believe that we do not cause bigger bias by including closed problems than by not being able to score open problem solutions without a bias.

References

- Byčkovský, P. and Zvára, K. (2007) *Konstrukce a analýza testů pro přijímací řízení*, Prague: PedF UK.
- Burjan, V. (2001) 'MONITOR 2001 – Pilotné testovanie maturantov', *Sborník příspěvků Letní školy z teorie vyučování matematiky Pythagoras 2001*, Bratislava: EXAM, pp. 5–11.
- Cihlář, J., Lesáková, E., Řídká, E. and Zelenka, M. (2007) *Očekávané výstupy v RVP ZV z matematiky ve světle testových úloh*, Prague: ÚIV, Tauris.
- Klůfa, J. and Kaspříková, N. (2012) 'Multiple-choice question tests for entrance examinations – a probabilistic approach', *Eries Journal*, vol. 5, no. 4, pp. 195–202.
- OECD (1999) *Measuring student knowledge and skills*, [Online] Available: <http://www.oecd.org/edu/school/programmeforinternationalstudentassessmentpisa/33693997.pdf> [24 Aug 2001].
- Řídká, E. (2007) 'Srovnatelnost testů', *Ani jeden matematický talent nazmar 2007*, Prague: PedF UK, pp. 168–178.
- Sedláčková, K. (2003) *Písemná maturitní zkouška z matematiky*, Prague: PedF UK.
- Sýkora, V. and Zhouf, J. (2002) 'Maturitní zkouška z matematiky, současný stav a problémy', *Učitel matematiky*, vol. 42, no. 2, pp. 103–113.
- Zhouf, J. (2005) 'Current reform of the school leaving examination in the Czech Republic', *CIEAEM 57, Changes in society: A challenge for mathematics education*, Palermo: Università Degli Studi, pp. 139–143.
- Zhouf, J. (2010) *Tvorba matematických problémů pro talentované žáky*, Prague: PedF UK.
- Zhouf, J. (2012) 'Porovnání otevřených a uzavřených problémů', *Sborník konference Setkání učitelů matematiky všech typů a stupňů škol 2012*, Plzeň: Vydavatelský servis, pp. 205–211.
- Zhouf, J. (2013) 'Categorisation of Multiple-choice Problems', *Procedia – Social and Behavioral Science*, vol. 93, pp. 592–596.

Opinions Of Academicians On The Concept Of Social Gender Role

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Abstract

The study was conducted to determine academicians' perceptions of and views on social gender roles. In this research, the phenomenology design, one of the qualitative research models, was used. The study group were the academicians who were working in universities located in various provinces in Turkey and who were volunteer to participate in the research. In the study, purposive sample type from non-random sample types were utilized. In this research, five questions about gender were asked to the academicians as a means of data collection. The questions were prepared with Google Docs and collected via e-mail and Facebook. The study group consisted of 71 academicians in total. The collected documents formed the main data source of the research. The data obtained in the research were analyzed by content analysis. The results from this study can be listed as follows: 49 academicians said that there was social inequality in the family and 22 academicians said that there was no difference. 31 academician stated that gender was an influencing factor in getting a job, 15 academicians stated that gender was not an influencing factor in getting a job and 25 academicians said that this situation would change according to profession and organization. 45 academicians stated that gender was an influencing factor in being selected as a manager, 17 academicians said that it was not an influencing factor in being selected as a manager, 9 academicians stated that this would change depending on the situation. 24 academicians pointed out that gender was an influencing factor in professional promotion, 39 scholars believed that it was not an influencing factor in this and 8 academicians stated that this would change depending on the situation. 56 academics stated that gender was an influencing factor in choosing a profession, 10 academicians stated that it was not an influencing factor and 5 academicians said that this would change depending on the situation.

Key Words: *Social gender role, academician, gender*

Introduction

Sex is one of the criteria used in order to differentiate and classify people. In the simplest term and basically, while sex is biologically defined, gender is defined in a cultural sense. Sex includes the structural, functional and behavioral characteristics of all living creatures, which are determined by the sex chromosomes (Torgrimson & Minson, 2005). According to the Oxford English Dictionary, sex (*noun*) is defined as “differences in the structure and function of the reproductive organs of living beings distinguished as male and female on that basis, and the other physiological differences resulting from this.” Gender may be regarded as behavioral, cultural or psychological features which are related to a sex typically. The word gender (*noun*) was derived from the Latin word “genus” which refers to the species or race. Gender (*noun*) is defined as the type that refers to the common hominid line. In this case, sex describes the genetic, physiological and biological traits which the one has as a male or female. It can be said that sex is an ascribed status. That an individual starts to become socialized in line with the values and norms of the society in which he or she lives is called as gender.

Gender is a concept related to the roles, duties and responsibilities that the society has assigned to the one, and concerning in which ways the society regards, perceives the one and its expectations from the individual (Seçgin, F and Tural, 2011). While being related to the concept of masculinity and femininity, gender does not have to be a direct outcome of the individual's biological sex (Giddens, 2008). Dökmen (2004) stated that gender concept includes the values, expectations, judgments and roles relevant to how the society perceives and considers the individual and what it expects the individual to do. Gender has differed in time and according to the theories. This case shows that it is changeable. It reveals how male and female should behave and that there are different duties expected to be performed by them. Roles present a certain status or social expectations attributed to the social standings, and analyze the realization process of these sorts of expectations (Marshall, 1999). Gender means sex related expectations that the society has defined and expected from the individuals to realize (İsen and Batmaz, 2002). The term “sex” indicates the biological aspect of being a woman or a man. Sex is a demographic category that is determined as based on the one's biological sex. The expression written on identity cards stands for this. As for the term “gender”, it involves the meanings which the society and culture attribute to being woman or man and expectations, cultural structure and also psychological features correlated with the individual's biological structure. Gender is a whole of psychosocial properties which characterize the individual as feminine or masculine (Rice, 1996). In order to eliminate this confusion, Gentile (1998) proposed five different terms: (1) sex; expresses biological function - sexual activities - (2) biologically sex-linked; states the features linked to the biological aspect of being woman or man - like color-blindness - (3) gender-linked; states the features linked to the cultural or social aspect of being woman or man - like the acceptance of that men are more aggressive - (4) sex- and gender-linked; indicates the features of both biological and social origin - like women's dealing with baby-care - (5) sex-correlated; states the features related to being woman or man, but whether the origin of which is biological or

cultural is not known. People are born biologically female or male, but they learn to be a girl or a boy while growing up. In this way, gender is a concept developing and changing in time; it differs from one culture to the other and in time; and, the woman's and man's roles and responsibilities and the power relations between these two sexes are defined according to these differences (Tümen, 2003).

According to Giddens, gender is something learned. Babies learn their sexes unconsciously. Before children can name themselves properly as a girl or a boy, they receive a series of signs (hairstyle, scent, and etc.) that are not uttered. The children at around two years old have an understanding or comprehension, even if not complete, about what the gender is and/or means. They are conscious of their own sexes, and can also classify the others. However, children, until they reach the age of five or six years, do not know that the one's gender does not change, everyone has gender, and sex differences between girls and boys are anatomy-based. The toys which little children see around them, illustrated children books and television programs underline the differences between male and female characteristics (Giddens, 2008). Seçgin and Tural (2011) stated that factors such as parents, teachers, the mass media, and etc., have an effect on not only the child's socialization but also the determination of the individual's gender role stereotypes. Sexual socialization constitutes one of the most important learning experiences for individuals. When the child starts nursery school, he or she can distinguish between sexual roles and is able to prefer his or her sex role. Boys are defined by masculine roles and girls by feminine ones (Brown, 1956). They learn the proper behavioral patterns. Hartley (1960) states children realize that the first female role is cleaning and the first male role is earning money, when they are at the age of four. In addition to the descriptions for sex roles and relevant expectations, girls and boys also learn the expectations of the society. They learn that boys are more esteemed than the girls. And as for the differences related to personality, while boys learn how to be active and successful, girls learn to be passive and affective. The eight-year-old children define girls as virtuous, proper, quiet and mild-mannered while they define adult females as nameless, ineffective, unlooked for, bad and exploitative (Hartley, 1959). In patriarchal societies like Turkey, as gender roles are shaping, traditionally, the roles of bearing and raising child, dealing with the household chores such as cleaning, cooking, and so on, and not taking an active role in business life are assigned to woman; on the other hand, the roles of being active in business life, ruling over financial issues and being the head of the household are attributed to men (Atış, 2010; Bhasin, 2003; Dökmen, 2004; Vefikuluçay, Zeyneloğlu, Eroğlu and Taşkın, 2007; Zeyneloğlu and Terzioğlu, 2011).

Discriminations associated with business life, family and marriage affect the status of women within the society in a negative way. An atmosphere of inequality in which women fall behind men in the society has occurred. However, nowadays, with the women's taking their own parts in business life and the upward tendency in their education levels, this has undergone a change (Attanapola, 2003).

The rise in women's education levels has introduced a contemporary perspective into the gender roles for individuals, and become a determinant of equality and justice for the benefit of woman. Enabling the social awareness to be gained is quite important so that the equality of woman and man can be ensured and the social status of woman can be enhanced. Therefore, it is essential to determine the academicians' opinions on gender. The objective of this study is to assess the opinions on gender which the academicians have adopted. Accordingly, the problem statement of the study is as below:

What are the academicians' opinions on gender?

Considering how the subject of gender is analyzed in the body of literature, foreign publications will be dealt at first, and following this, domestic publications will be mentioned. In foreign literature, certain studies analyzing the attitudes towards role sharing in families (Smith and Reid, 1986; Cooper, Chassin and Zeiss, 1985), carried out on the female and male sex roles (Bradbury and Fincham, 1988), analyzing the relation between sex roles and marriage satisfaction (Lye and Biblarz, 1993; Juni and Grimm, 1994; Guzman, 1996; Lee, 1999), and determining the high school and university students' perceptions on gender roles (Kimberly and Mahaffy, 2002; Rosenkrantz and et. al., 1986; Trommsdorff and Iwawaki, 1989; Keith and Jacqueline, 2002) have been encountered.

When the relevant literature in Turkey is reviewed, the publications analyzing the relation between sex roles and marriage satisfaction (Tezer, 1992; Curun, 2006; Çınar, 2008; Demirtaş and Dönmez, 2006), and the ones analyzing the attitude, perception and opinion on gender (Aylaz, Güneş and Uzun, 2014; Baykal, 1988; Girginer, 1994; Dinç Kahraman, 2010; Sis Çelik, Pasinoğlu, Tan and Koyunca, 2013; Pinar, Taşkın and Eroğlu, 2008; Aşılı, 2001; Güven, 1996; Vefikuluçay and et. al., 2007; Ersoy, 2009; Karasu, Göllüce, Güvenç and Çelik, 2017; Seçgin and Tural, 2011; Ünal, Tarhan and Çürükoğlu Köksal, 2017; Yaman Efe and Ayaz, 2015; Çetişli, Top and Işık, 2017; Öngen and Aytac, 2013) have been seen.

Method

1. Research Model

Phenomenological design, one of the qualitative research models, has been used in this research. Phenomenology is the qualitative research design which aims to reveal the individuals' experiences relevant to a specific phenomenon. It presents introductory information about the phenomenon that we intend to research and helps us to make sense of the phenomenon (Creswell, 2016: 78-79). Since the academicians answer the research question by benefitting from their own experiences, phenomenological design has been employed in the research.

2. Collection of Data

In the research, as data collection means, 5 questions on the subject of gender were asked to the academicians. The questions were prepared in Google docs and collected via e-mail and Facebook. 91 feedbacks in total were received. 20 of those were excluded due to reasons such as inaccurate sampling, giving incomplete information, leaving the answer blank and so on. Therefore, totally 71 academicians are included in the study group. All those collected documents constituted the core data source of the research. The answers given by the academicians were kept confidential by the researcher and were not shared with any other person. The problem statement of the research is in the following.

- What are the academicians' perceptions on gender?

3. Analysis and Interpretation of Data

Data obtained in the research were analyzed by the method of content analysis. Content analysis is among the analysis methods which are mostly employed in the studies in the field of social sciences. Content analysis is the analysis within the scope of which the existence of the research object consisting of text or texts is specified by words, phrases or sentences (Büyüköztürk et. al., 2012). In this research, the answers given by the academicians were coded and classified into categories by the researcher. Each of the answers formed was grouped by themes. Data was analyzed according to the analysis stages that were established by Büyüköztürk et. al (2012).

3.1. The stage of determining the objectives:

In this research, the researcher has aimed to reveal the academicians' perceptions on gender, through the answers they give to the questions in the interview form. The answers given by the academicians in the interview form constituted the source of data of the research.

3.2. Classifying the relevant data:

The researchers organized the data obtained at that stage as based upon theoretical framework. The academicians participating in the research were firstly grouped according to their educational backgrounds. Then, they were given codes according to their sexes. For instance, a female assistant professor was coded as Dr.F.1.

3.3. Developing the logical structure:

The answers given by the academicians participating in the research were reviewed and sorted by frequency counts and percentages. In the event that questions left unanswered by the academicians are available, these have been excluded from the research. It was determined that received answers would be arranged according to the categories developed, educational status and sex.

3.4. Determining the coding categories:

At that stage of the research, data were read and valid answers were determined. After being analyzed, the common points in the answers were detected. Considering the grounds in common, categories were formed.

3.5. Counting / Digitization:

At that stage of the research, answers were systematized by being tabulated in frequencies (f) and percentages (%).

4. Validity and Reliability

Validity in qualitative researches is the condition in which the researchers, participants and/or subjects and readers assess the same thing in the same way, in consequence of the analysis of data (Creswell, 2016). In this research, validity has been tried to be ensured by explaining the analysis of data obtained in a detailed way and giving a direct coverage to the academicians' opinions related to the findings. Reliability in qualitative researches is explained in the way that the data obtained are reviewed by more than one coder and a shared decision is made in cases where dissent is (Creswell, 2016). In this research, data have been coded, classified and also the process of forming categories has been carried out by the two researchers. The differences in views were resolved by way of the researchers' getting together and arriving at a shared decision. Patton (2014) explains this case as the investigator triangulation. Investigator triangulation is the case where two or more researchers take part in an integrative analysis by analyzing the data of a research independently, and then comparing the data obtained.

5. Study Group

The study group of the research consists of the academicians who serve at the universities in various cities of Turkey and have agreed to voluntarily participate in the research. Purposeful sampling, which is of the non-random sampling techniques, was applied in the research. Purposeful sampling means specifying a community which is the most appropriate to the issue to be studied on as the subject of observation (Sencer, 1989, pg. 386). As a feature of qualitative research, it is determined in accordance with the considerations, typicality and the condition of having specific properties that all will assist to the researcher's study. In this way, to constitute a satisfying sampling for the researcher's special needs is aimed (Cohen, Manion and Marrison, 2007, pg. 114, 115; Fraenkel

and Wallen, 2009; pg. 99). Within the scope of this research, detecting academicians' perceptions on "gender" concept has been desired.

Table 1. Demographic information of academicians

Gender	N	%	Educational Level	N	%
Female	33	46,5	Master	28	39,4
Male	38	53,5	Phd	43	60,6
Total	71	100,0	Total	71	100,0
Age	N	%	Monthly Income (TL)	N	%
25-30	23	32,4	1000-2500	1	1,4
30-35	27	38,0	3000-4500	30	42,3
35-40	13	18,3	4501-6000	25	35,2
40-45	6	8,5	6001-7500	9	12,7
55-60	1	1,4	7501-9000	5	7,0
70-75	1	1,4	9000 +	1	1,4
Total	71	100,0	Total	71	100
Living Region	N	%	Title	N	%
Central Anatolia	25	35,2	Lecturer	3	4,2
Aegean	8	11,3	Instructor	10	14,1
Eastern Anatolia	5	7	Research assistant	28	39,4
Southeastern Anatolia	1	1,4	Research assistant Dr.	4	5,6
Mediterranean	3	4,2	Assistant professor	13	18,3
Black Sea	19	26,8	Associate Professor	10	14,1
Marmara	8	8	Professor Dr.	3	4,2
Abroad	2	2,8	Total	71	100
Total	71	100,0			
Number of Books Per Month	N	%			
0	8	11,3			
1-2	36	50,7			
3-4	14	19,7			
5-6	9	12,7			
7-8	1	1,4			
9-10	3	4,2			
Total	71	100			

Findings

In this part of the research, the answers which the academicians had given to the questions related to gender were initially subjected to the content analysis, and thereafter, interpreted and presented in tables.

Table 2. Academicians' opinions on the effect of gender differences in family

	f	Category	Theme	f
Yes	49	Social Reasons	Customs	9
			Social Directions	8
			Patriarchal	5
			Point of View	3
			Environment	2
			Media	1
			Biological Reasons	Physical Power
		Predisposition/Talent		6
		Temperament		3
		No	22	Educational Level
Responsibilities	12			
Mutual Life	10			
Modernization	1			

In Table 2, academicians' opinions on gender differences in family are presented. The answers that they had given were analyzed by categorization and thematization. 49 of the academicians have mentioned that gender difference is effective at home and the mentioned effect depends on social and biological reasons. Among the social reasons, the ones restated at most are that customs, i.e. social mores, are highly effective, the society directs individuals and the differences result from the patriarchal family structure. In terms of biological reasons, the ones mostly repeated in the opinions expressed by the academicians are in the way that the distribution of tasks is according to the abilities and/or talents of sexes, and the man is active in situations requiring physical strength and power. Apart from this, the number of academicians who have stated that sex is not effective is 22, and the reason of why they say no can be seen from their statements indicating that the responsibilities in the family are equal and life is mutual.

The sample of answer:

Dr. F. 58. *Yes. Because of the ways we are raised, some tasks are suitable for men, and other tasks are suitable for women. Apart from that, I think that women's jobs in the house, probably because they spend more time at home than men. Usually, women finish household chores more diligently. For example, for men, some household tasks are done in a fast fashion unlike women. While men place dishes at random in the dishwasher, women place the dishes more precisely and more often than not in a way that they can fit in the contaminant. If they were placed by a man, the woman would probably replace those dishes and allow more space for other ones. Thus, the dishwashing work is done twice. Instead, the woman may prefer her husband to do the shopping. I think there is a task sharing in every house. A share in which the woman and the man take on the tasks she can do better in her ability.*

Table 3. Academicians' opinions on gender difference in acquiring job

	f	Category	Theme	f
Yes	31	Job-related Reasons	Employer's point of view (9)	23
			Required qualification (14)	
		Reasons Related to Women	Marital status / Child (6)	19
			Benevolent sexism (5)	
			Responsibilities (4)	
Sexism (2)				
Reasons Related to Men	Pregnancy (2)	11		
	Confidence (1)			
		Social judgment / expectation		2
No	15	Achievement		5
		Competence		4
		Service Sector		2
		Should not be effective		1
		Pulling the wires		2
Sometimes	25	According to Profession		17
		According to Institution		7
		According to Position / Status		1

In Table 3, academicians' opinions on gender differences in acquiring job are included. The answers given by them were analyzed by categorization and thematization. Most of the academicians (n=31) have expressed their opinions in the way that gender difference is effective in acquiring a job. They have stated that the reason of why they answered in that way is its being related to job and especially resulting from being a woman or man. They have also stated the qualification required by the job and the importance of the employer's point of view, that women may have difficulty in acquiring a job if they are married with children, and on the other hand, as some business enterprises attach particular importance to appearance, women may acquire job in an easier way. Moreover, they have expressed that it can be easier for men to acquire a job since they are strong and do not have any special cases like pregnancy. Answers indicating that gender difference is not effective have been also received from the academicians (n=15). The reason for these answers has been explained in the way that the one who is successful and competent would acquire the job. Beside this, there are also academicians who state that it will change according to the case (n=25).

DR. F. 13. *Yes, because women have different responsibilities. Male employees are the reason for preference. Turkey Statistical Institute data for 2016 says that one-fifth of female employment of male employment. There is no clear scientific conclusion, but single women and married male employees are preferred especially in the private sector. It may be because single women are more independent and married men have more regular lives.*

In the meantime, you should not ignore a segment of the population who seem very modern from the outside that believes that women are shrinking the business sector, and believes that a child should be looked after at home. Unfortunately, women are also under the influence of manipulative psychologists like Adem Güneş, and they have begun to betray their children to continue their working life. In recent years, we have been slowing down on these issues, which may be another study issue.

Table 4. Academicians' opinions on gender difference in being elected as executive

	f	Category	Theme	f
Yes	45	Reasons Related to Men	Logic (12)	27
			Authority (6)	
			Dominancy (4)	
			Leadership (3)	
			Achievement (2)	
		Social Reasons	Patriarchal (5)	11
			Prejudices / codes (5)	
			Child-rearing Manner (1)	
		Reasons Related to Women	Liabilities at home (6)	15
			Sexism (5)	
Glass ceiling syndrome (3)				
Pregnancy (1)				
No	17	Achievement	5	
		Equal conditions / circumstances	3	
		Competence	4	
		Ideological Favoritism	2	
		Increase in Female Employee Rates	1	
		Sometimes	9	According to Job
		According to Institution	3	
		Occupational Expectation	2	
		According to Person	2	

In Table 4, academicians' opinions on gender difference in being elected as executive are involved. The answers given by them were analyzed by categorization and thematization. Most of the academicians have expressed their opinions in the way that gender difference has an effect on being elected as executive (n=45). It was seen that the personal reasons arising from the women and men themselves and additionally the structure of the society are effective in terms of being elected as executive. It was stated that men are elected as executive due to the fact that they are logical, can easily assert their authority and are dominant characters. Moreover, they have stated that women are not elected as executive since their responsibilities at home are much, and due to the gender-based approaches to women and a point of view related to glass ceiling syndrome keeping women from rising in the ranks no matter how hard they try. It was pointed out that gender would lead to a great difference in advancing in the career and/or business life as socially a patriarchal structure is possessed and the society has certain prejudices as a consequence. Besides, some of the academicians have expressed that it does not have an effect (n=17). They have stated that the one who is successful can get his or her promotion as based on the view that women are equal men in being executive. In addition to this, academicians stating that it will change according to circumstance (n=9) are also present.

Ms. M, 38. *Yeah. Women do not act professionally because they are emotional beings.*

Table 5. Academicians' opinions on gender difference in being promoted

	f	Category	Theme	f
Yes	24	Social Reasons	Social prejudice (7)	15
			Social perspective (6)	
			Social expectation (2)	
		Reasons Related to Men	Easy for men (5)	9
			Complex (3)	
			Authority	
Reasons Related to Women	Woman's responsibilities (4)	6		
	Easy for women			
	Marital status			
No	39	Equal	8	
		Industriousness	7	

		Qualification	3
		Equity	3
		Should not be effective	2
		Pulling the wires	2
Sometimes	8	According to Position / Status	5
		According to Institution	2
		According to Person	3

In Table 5, academicians' opinions on gender difference in being promoted are presented. The answers given by them were analyzed by categorization and thematization. Most of the academicians have expressed their opinion in the way that gender difference is not effective in terms of being promoted (n=39). They have stated that woman and man are equal when it comes to be promoted, and the one who is successful will advance in his/her business life. Also, some of the academicians have put forth that gender has an effect upon being promoted (n=24). The reason of its being effective has been explained by the views indicating that it can result from a social prejudice, and additionally, a negative social perspective towards the woman's getting promoted exists, men advance in their careers more easily and woman's responsibilities and/or duties at home are also effective in this sense. Moreover, there are academicians stating that it will change according to circumstance (n=8).

Dr. F, 58. *No, I think they are more fair in career upgrades. In particular, I think that the gender discrimination in the career upgrades. through examinations is not taken very seriously.*

Table 6. Academicians' opinions on gender difference in the choice of profession

	f	Category	Theme	f
Yes	56	Social Reasons	Expectation (14)	34
			Cultural Structure (11)	
			Social Pressure (4)	
			Social role (2)	
			Sexism 2	
			Family Discipline 2	
		Reasons Related to Individuals	Suitability for professions 22	41
			Physical structure 11	
			Personality / nature 5	
			Responsibility (2)	
			Women's travel restrictions	
No	10	Modernization		5
		Desire		3
		Merit		2
Sometimes	5	According to Profession		1
		According to Person		1
		Job Definition		3

In Table 6, academicians' opinions on gender difference in the choice of profession are involved. The answers given by them were analyzed by categorization and thematization. Most of the academicians have expressed their opinion in the way that gender difference is effective in being promoted (n=56). They have clarified the reason why they gave that answer by stating that it takes its source from the society itself and individuals; the society has an expectation from men and women to choose some certain professions; the cultural structure requires for individuals to make this choice; and women and men are more predisposed to some professions in terms of their physical and emotional structures. Some of the academicians have also stated that gender difference is not effective in being promoted (n=10). They have explained the reason of giving this answer by stating that women and men can choose a profession at their own pleasure by virtue of modernization. Additionally, academicians who have expressed that it will change according to circumstance (n=5) are also present.

Dr. F, 1. *Certainly there are some features that bring the sexes, but they can vary even within the same sex. I think that the individual has a direct relation in choosing a self-sufficient profession.*

Conclusion and Discussion

49 of the academicians have stated that social disparity exists within the family, and 22 of them have asserted that there is no difference. Academicians have put forward that customs and traditions are influential, and additionally, the society directs individuals and has a patriarchal structure, as the reason of this social inequality in the family.

Öngen and Aytaç (2013) explain that the reflections of gender roles on communal living shape the women's and men's lives in different ways as traditional and egalitarian roles. Karasu and Göllüce (2017) have stated that gender-based discrimination has its root in the family itself, and women and men who approve gender inequality will have been raised, in conclusion, as based upon the fact that girls and boys are directed differently by the society. Considering the biological reasons, they have expressed their opinion in the way that sexes have different distribution of roles according to their abilities and man is more active in the situations requiring strength. In the body of literature, it has been seen that men deal with the out-of-home activities which require power and/or strength, while women engage in domestic responsibilities such as cooking, cleaning and so on (Weitzman et. al, 1972: 1125). Apart from this, the number of academicians stating that gender is not effective is 22, and they have also expressed that the distribution of tasks is performed equally. Families are known to be important institutions in the process of socialization. Families convey their own world-views to their children while raising them; however, children learn various things during the process of communication with the other people around, are affected by the media, television programs and books, and also acquire the others' views and stereotypes of the social circles where they are in (Arat, 1996). So, this promotes the results of the study.

31 of the academicians have stated that gender difference is effective in acquiring job; 15 of them that it is not important in terms of acquiring a job and 25 of them that it will change according to the profession and institution. 56 of the academicians have expressed that gender difference has an effect upon determining or choosing the profession, 10 of them that it is not effective and 5 of them that it will change according to circumstance. Starting from this, the conclusion arrived at is that gender stands for an influential factor in acquiring job, getting job and being elected as executive. In regard to be promoted, that gender difference is not considered as effective is concluded from the answers given. The existing stereotypes indicating that women are emotional, but men are not (Dökmen, 2012) and that women are considered as more sensitive, interested and caring while men are perceived as independent, assertive, with a leader spirit and strong lead them to serve in professions including these features (Dökmen, 2004). In the study carried out by Gönüllü and İçli (2001), the most suitable professions for girls have been specified as teaching, civil service, and they have decided on the professions such as engineering, advocacy, and being a doctor for boys. Çelik et. al (2013) have given a coverage to enabling woman to participate in communal living on an equal basis, preventing woman from being detached from working life by the articles related to pregnancy and maternity leave, opening kindergarten and day nurseries and so on, within the scope of the regulatory laws on working life, and strengthening the unity of family. This case is for preventing women's being detached from the business life. As is seen from the results, it has been observed that women in Turkish society are thrown background out of focus in working life. The perspective of the society and the employer's point of view have been shown as the reason for this. Physical and emotional characteristics of women have sometimes been reasons for preference; but however, sometimes they have not been preferred because of these same characteristics. Women's taking in charge actively for domestic life accelerates their being detached from professional life (Özçatal, 2011).

45 of the academicians have stated that gender is effective in being elected as an executive, 17 of them that it is ineffective and 9 of them that it will change according to circumstance. 24 of the academicians have expressed that gender difference is effective in being promoted, 39 of them that it is not effective and 8 of them that it will change according to circumstance. Leadership is to gather people on the basis of specific objectives and also the whole of knowledge and skill which will motivate people into realizing these objectives. Leadership is the skills which are inherent in every individual, can be potentially learnt and are improved (Grossman and Valiga, 2005). From past to present, in almost all societies, women have not been represented enough in the world of power, leadership and business which stands for the world of men; professionalism, authority and leadership have been the characteristics or traits identified for men (Terzioğlu and Taşkın, 2008). In the study carried out by Brooks and Bolzendahl (2004), it is seen that individuals exhibit positive attitudes in terms of the effects of gender perspective on woman's leadership behaviors. In this study, academicians have stated that women's responsibilities related to domestic life, as well as their physical and emotional traits, pose an obstacle for them to be elected as an executive. In literature, although publications asserting that men are acceptable as executive are generally encountered, the exact opposite result has revealed in the study which Aylaz et. al (2014) carried out. In other words, women are also able to carry out the executive task inasmuch as men can do. Judgments towards women such as their working in lower-paying occupations, not being able to work without receiving their husband's permission and/or consent, not staying out at night and not living alone, and mother role in family still exist; and as for men, the consideration of assigning the reverse roles is common. These sorts of discrimination affect the woman's social status negatively. Woman falls behind man. Yet, at the present time, this situation has changed in favor of woman (Attanapola, 2003).

Suggestions;

Academicians' perceptions and detections for gender have revealed highly important outcomes. Accordingly, the following suggestions can be brought forward.

In Turkey, within the scope of higher education programs, lectures for Gender can be included. Paying attention to that the contents of these lectures be same for each educational institution can be suggested. These lectures should be in interrogating quality, participative and responsive.

This study is in the quality of a fenemongly. New studies can be carried out by different methods. These studies can be performed with different sample groups. Also, the studies can be repeated with the same sample groups at regular intervals. Thus, it can be observed whether a change is in question, or not.

Academicians are the figures significant for the society. Various panel discussions can be arranged and/or organized in order to inform the individuals by the academicians who have studies on gender.

References

- Arat, N. (1996). *Kadın gerçeklikleri*. İstanbul: Say Yayınları.
- Attanapola, C. T. (2004). Changing gender roles and health impacts among female workers in export-processing industries in Sri Lanka. *Social science & medicine*, 58(11), 2301-2312.
- Aylaz, R., Güneş, G., Uzun, Ö., & Ünal, S. (2014). Üniversite öğrencilerinin toplumsal cinsiyet rolüne yönelik görüşleri. *Sürekli Tıp Eğitimi Dergisi*, 23(5), 183-189.
- Atış, F. (2010). *Ebelik/ hemşirelik 1. ve 4. sınıf öğrencilerinin toplumsal cinsiyet rollerine ilişkin tutumlarının belirlenmesi*. Yayınlanmamış Yüksek Lisans Tezi, Çukurova Üniversitesi Sağlık Bilimleri Enstitüsü, Adana.
- Baykal, S. (1988). Üniversite öğrencilerinin cinsiyet rolleri ile ilgili kalıp yargılarının bazı değişkenler açısından incelenmesi, Yayınlanmamış Doktora Tezi, Hacettepe Üniversitesi, Ankara.
- Bradbury, T.N., Fincham, F.D. ve Campbell, S.M. (1995), Longitudinal and behavioral analysis of masculinity and femininity in marriage, *Journal of Personality and Social Psychology*, 68(2), 32-341.
- Büyüköztürk, Ş., Çakmak, K. E., Akgün, E. Ö., Karadeniz, Ş. & Demirel, F. (2009). *Bilimsel araştırma yöntemleri*, Ankara: PegemA.
- Cetişli, N. E., Top, E. D., & Gülşen, I. (2017). The gender attitude related roles of university students who continued or not the gender equality course. *Florence Nightingale Hemşirelik Dergisi*, 25(2), 104-110.
- Cohen, L., Manion, L. & Morrison, K. (2007). *Research methods in education*. London New York: Routledge Falmer.
- Creswell, J. W. (2014). *Research design: qualitative, quantitative, and mixed methods approaches*. California: Sage.
- Cooper, K., Chassin, L. ve Zeiss, A. (1985), The relationship of sex role self-concept and sex role attitudes to the marital satisfaction and personal adjustment of dual-worker couples with preschool children, *Sex Roles*, 12 (1-2), 227-241.
- Curun, F. (2006), *Yüklemeler, iletişim çatışmaları, cinsiyet ve cinsiyet rolü yönelimi ile evlilik doyumu arasındaki ilişki*, Doktora Tezi, Ankara Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Çınar, L. (2008), *Evlilik Doyumu: Cinsiyet Roller ve Yardım Arama Tutumu*, Yüksek Lisans Tezi, Gazi Üniversitesi Sosyal Bilimler Enstitüsü, Ankara.
- Demirtaş, H. A. ve Dönmez, A. (2006), Jealousy in close relationships: Personal, relational and situational variables, *Türk Psikiyatri Dergisi*, 17 (3), 181-191.
- Diñç Kahraman, S. (2010). Determination of the opinions of women against social gender inequality. *DEUHYO ED 3* (1), 30-35
- Dökmen, Z. Y. (2004). *Toplumsal cinsiyet, sosyal psikolojik açıklamalar*. İstanbul: Sistem Yayıncılık.
- Dökmen, Ü. (2012). *Sanatta ve günlük yaşamda iletişim çatışmaları ve empati*. İstanbul: Remzi Kitabevi.
- Efe, Ş. Y., & Ayaz, S. (2013). Opinions of elementary teaching students regarding gender. *Türkiye Klinikleri Journal of Medical Ethics-Law and History*, 21(3), 118-126.
- Ersoy E. (2009). Woman and man identity in gender culture (example of Malatya). *Fırat University Journal of Social Science*, 19 (2), 209-230.
- Fraenkel J. R. & Wallen N. E. (2009), *How to design and evaluation research in education*. New York: McGraw-Hill.
- Gentile, D. A. (1998). "Just what are sex and gender, anyway? A call for a new terminological standard." D. L. Anselmi, A. L. Law (Eds.). *Questions of Gender: Perspectives and Paradoxes in*, s. 14-17. Boston: McGraw-Hill.
- Giddens, A., (2008). *Sosyoloji*, İstanbul: Kırmızı Yayınları.
- Girginer U. H. (1994). *Türk toplumunda cinsiyet rolleri algısı*. Ege Üniversitesi Sosyal Bilimler Enstitüsü Psikoloji Anabilim Dalı. Yayınlanmamış Yüksek Lisans Tezi. İzmir.
- Gönüllü M. & İçli G. (2001) Women in work place: Their relations to family and work. *Cumhuriyet Üniversitesi Sosyal Bilimler Dergisi*. 25(1), 81-100.
- Guzman, R. C. (1996), *Attitudes toward traditional versus egalitarian gender roles in dual- earner marriages and their effect on marital satisfaction*, Master's Thesis, California State University, Long Beach.
- Grossman, S. C., & Aliga, T. M. (2005). *The new leadership and management challenge creating the future of*

nursing. USA: Davis Company.

- Juni, S. ve Grimm, D. W. (1994), Marital satisfaction as a function of dyadic gender role constellations, *American Journal of Family Therapy*, 22 (2), 106-112.
- İsen, G. & Batmaz, V., (2002), *Ben ve toplum*, İstanbul: Om Yayınevi.
- Karasu, F., Göllüce A., Güvenç, E. & Çelik S. (2017). The attitudes of the university students' regarding the gender roles. *Süleyman Demirel Üniversitesi Sağlık Bilimleri Enstitüsü Dergisi*. 8 (1), 35-41.
- Keith, B. & Jacqueline, S. (2002). Parent and adolescent gender role attitudes in 1990's Great Britain, *Sex Roles*, 46 (7/8): 239–244.
- Mahaffy, A. K. & Ward, K. (2002). The gendering of adolescents' childbearing and educational plans: reciprocal effects and the influence of social context, *Sex Roles*, 46 (11/12), 403–417.
- Lee, S. C. (1999), Marital satisfaction factors for Korean-Americans, Master's Thesis. Andrews University, School of Education, Michigan.
- Lye, D. N. & Biblarz, T. J. (1993), The effects of attitudes toward family life and gender roles on marital satisfaction, *Journal of Family Issues*, 14 (2), 157-188.
- Marshall, G., (1999). *Sosyoloji sözlüğü*, (Translate, Osman Akınhay-Derya Kömürçü), Ankara: Bilim ve Sanat.
- Patton, M. Q. (2014). Nitel araştırma ve değerlendirme yöntemleri. Mesut Bütün, Selçuk Beşir Demir (Çev. Ed.), 3. Baskıdan Çeviri, Ankara: Pegem Akademi Yayıncılık.
- Pınar, G., Taşkın, L., & Eroğlu, K. (2008). The behaviours of the students in dormitory of baskent university against sexual role patterns. *Hacettepe University Faculty of Health Sciences Nursing Journal*, 15(1), 47-57.
- Oxford English Dictionary. New York: Oxford University Press, 1989.
- Öngen, B., & Aytaç, S. (2013). Attitudes of university students regarding to gender roles and relationship with life values. *Journal of Economy Culture and Society*, (48), 1-18.
- Özçatal, E. Ö. (2011). Patriarchy, gender and women's participation in working life. *Çankırı Karatekin Üniversitesi İİBF Dergisi*, 1(1), 21-39.
- Rice, F. P. (1996). *Intimate relationships, marriages, and families*. California: Mayfield Publishing.
- Rosenkrantz, P., Vogel, S., Bee, H., Broverman, I. & Broverman, D. M. (1986). Sex roles stereotypes and self-concepts in college students, *Journal of Consulting and Clinical Psychology*, 32 (3): 287–295.
- Seçgin, F., & Tural, A. (2011). Attitudes on gender roles of primary school teacher candidates. *Education Sciences*, 6(4), 2446-2458.
- Sis Çelik, A., Pasinlioğlu, T., Tan, G., & Koyuncu, H. (2013). Determination of university students' attitudes about gender equality. *Florence Nightingale Hemşirelik Dergisi*, 21(3), 181-186.
- Smith, A. D. and Reid, W. J. (1986), Role expectations and attitudes in dual-earner families, *Social Contemporary Social Work*, 67 (7), 394-402.
- Terzioğlu, F. & Taşkın, L. (2008). Reflections of social gender role on female leadership behavior and nursing profession. *CÜ Hemşirelik Yüksekokulu Dergisi*, 12(2), 62-67.
- Tezer, E. (1992), Evlilik doyumu ve iş doyumu: Bir ön çalışma, *Psikolojik Danışma ve Rehberlik Dergisi*, 1 (3), 24-26.
- Trommsdorff, G. & Iwawaki, S. (1989). Students' perceptions of socialisation and gender role in Japan and Germany. *International Journal of Behavioral Development*, 12(4), 485-493.
- Torgimson, B. N., & Minson, C. T. (2005). Sex and gender: what is the difference? *Journal of Applied Physiology*, 99, 785-787.
- Türmen T. (2003) [Gender and women's health]. In: Akın A, editor. Gender, health and women. Ankara, Turkey: Hacettepe University Women's Research and Implementation Center (HUWRIC)
- Ünal, F., Tarhan, S., & Köksal, E. Ç. (2017). The Role of Gender, Grade, Department and Socialization of Gender Norms in Predicting Perception of Gender. *Bartın University Journal of Faculty of Education*, 6(1), 227.
- Vefikuluçay, D., Zeyneloğlu, S., Eroğlu, K., Taşkın, L. (2007). Perception of and views on gender roles of senior students enrolled at Kafkas University. *Journal of Hacettepe University School of Nursing*, 14(2), 12-27.
- Zeyneloğlu, S., & Terzioğlu, F. (2011). Development and psychometric properties gender roles attitude scale Hacettepe University Journal of Education, 40, 409-420.

Opinions of School Principals on Financing Primary Education in the Context of Neoliberal Politics

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Abstract

The aim of this research is to provide insights into how funding for basic education, which is not beneficial to public financing, is provided by educational administrators and which problems they are financing while providing financing. In the study, in-depth interviewing technique was applied from qualitative research methods. In the study group of the study, criteria sampling method was used for purpose sampling methods. A group of eighteen school principals, three primary and secondary schools with high socioeconomic level and medium and low levels, were established in Ankara with the objective sampling method. An interview form was created by the researcher, presented to field experts working in the field of educational economics and reorganized by taking their opinions. For clarification of the interview questions, three school principals were also pre-applied, and unanswered questions were rearranged. Descriptive analysis and content analysis techniques were used to analyze the research data. In the survey, 18 primary schools (preschool-primary-secondary school) were interviewed. There are 6 administrators from each type of school. Six of the schools were selected from low-economic, medium, and relatively economical regions. Eight of the managers are female and 10 are male. Managers have more than five years of experience, 11 to 5 to 10 years, and 4 to 10 years of management experience. School income sources are generally referred to as fees, donations, registration fees, and income from various activities. It has been found that the public contribution is transferred to schools in very little service, and the resources transferred to private schools increase inequality in education.

Keywords: *Education; Education Finance; Primary Education; Neoliberal Policy*

Introduction

Education is one of the most important services that determine the future of an country. Because education has benefits both for the individual and for collecting. Education remains a matter of debate whether the financial resources allocated will be met by the public or beneficiaries of the education service. The Board (2002) describes education as a personal and social investment that is provided to different sectors, such as employers and the state, international organizations, as well as students and families. In this research, it is discussed who will meet more financial resources. The financing of public education away with the neoliberal transformation taking place in the world and Turkey is gaining weight and who benefit from the educational services that meet the required financing. compulsory education in Turkey said that although Although such services have to be met by public funding on the one hand, compulsory schooling families. As stated by the Council (2012), it is observed that there are two approaches to providing education in the world. These are the approach of financing education to the public budget and the approach of financing educational funds to beneficiary students and families. In our country where neoliberal economic policies are applied, it can be said that the second approach gains importance in education financing.

There are generally three different approaches to financing education in the world. One of the approaches to education-funded "direct financing" is the public funding of education expenditures, ie taxation approach. The state meets the educational resources with the tax as if it were in the public good. The second concept is the "indirect (private) financing method" in which financial resources in education are financed from the students' families. Education is to pay for the goods with fees instead of taxes. Thirdly, the "hybrid financing method" is a "partial financing" approach based on the direct or indirect funding of all segments benefiting from education. Educational resources are financed by the public and private sectors. While the state supplies training goods, the private sector also recognizes this privilege and reduces public financing by providing privatization of education in a sense. In other words, it pays education financing completely to those who use education services. There are many researches on this subject (Ünal, 1996, Adem, 2008, Karakutük, 2017, Board Tural, 2002, Tonbul, 2016). Analyzing the structure of education expenditure in Turkey is a very important part as 37% of total education expenditure is carried out by private enterprises. In the OECD average, however, only 12% of total education expenditure is made by private sources. made by public spending on education in Turkey remains behind the OECD average (ERG, 2009). In this case, it is seen that education planning and finance management are centralized and localization policies are applied in practice (Karakul, 2014). In line with development plans, the development of the financial policies of education programs is mostly based on the state financing of compulsory

education, participation of educated beneficiaries in expenditure at other levels of education, saving as much as possible in education expenditures, raising the resources to be allocated for training with general budgetary funds and increasing the share of private enterprise in education service provision (Küçük, 2010).

General education policies in Turkey, the number of work produced in the context of special education funding policy is limited. There are many reasons why researchers work in a limited manner in their policy of financing education. This is because individuals perceive politics as an element of conflict and thus confuse the data collection process, or school administrators tend to accept education policy and education funding politics in particular as a result of being left passive, and to give up the solution. Nevertheless, any change in the policies related to educational institutions can affect the schools that are the smallest unit of the education system, and the administrators and teachers working in these schools, positively or negatively (Altunay and Ağaçdiken, 2016).

In this study, it was aimed to show the opinions of how the education administrators provided financing in the basic education which is not injured by public finance, and what problems they faced while providing financing.

Method

In-depth interviewing technique is applied from qualitative research methods. In-depth interview Punch (2011) is a good way to make people aware of reality, its meanings, its description, and its construction. It is a technique that examines in detail the research topic by asking open-ended questions in depth interview, listening to them, recording answers and asking additional questions related to them (Kümbetoğlu, 2008). The participant is experienced at the beginning of the interview period, and the researcher is also curious. As the differences in the points of view during the process become apparent to the researcher, the researcher's assumptions decrease. The participant also undergoes a change due to having narrated his story in depth (Seggie, Bayyurt, 2015). A purposeful sampling method was used in this study.

The study group

In the study group, criteria sampling method was used for purposeful sampling methods.. Criterion sampling is the creation of samples of people, events, objects, or situations that have the qualities set in relation to the problem (Büyükoztürk et al., 2009). The advantage of this approach is that researchers use their previous knowledge and skills in the selection of subjects (Balci, 2007). A group of eighteen school principals, three primary and secondary schools with high socioeconomic level and medium and low levels, were established in Ankara with the objective sampling method. An interview form was created by the researcher, presented to field experts working in the field of educational economics and reorganized by taking their opinions. For clarification of the interview questions, three school principals were also pre-applied, and unanswered questions were rearranged.

Data collection and analysis

The interview form prepared was submitted to the opinion of field experts in order to check the relevance, suitability and applicability of the grade for the purpose of the research. An interview form has been arranged according to the recommendations of the experts. Expert examination, participant approval and negotiations with the managers have long been tried in the research to ensure internal validity through long-term interaction. In addition, the consistency of the findings from collected data was checked to increase the plausibility of the data. Towards this, the consistency of the findings with the conceptual framework used in the development of the interview form was constantly checked.

The data of the study were collected during the time when the participants could express themselves easily and in the environments where voice recording could be done, when they made an appointment. Interview questions were directed to each participant with the same words.

Descriptive analysis and content analysis techniques were used to analyze the research data. Descriptive analysis; (Yildirim and Şimşek, 2013), where the data obtained are summarized and interpreted according to a pre-determined theme, frequently the direct quotations are used in a striking way to reflect the views of the interviewed individuals, and the results obtained are interpreted in terms of the causal relationships. The descriptive analysis technique was performed within the framework of three steps of efficacy (reduction of data, presentation of data, conclusion and validation) (Türnüklü, 2000). In the presentation of the data, the criteria for the selection of the citation (different opinion), explanatory (suitability to the theme), diversity and extreme examples were taken into consideration (Ünver, Bümen ve Başbay, 2010).

Results

The findings of this study aimed at revealing the problems faced by the principals of primary education schools (elementary and junior high school) in financing their schools and the methods they have found to cope with these problems have been revealed.

In the survey, 18 basic education schools (preschool-primary-secondary school) were interviewed by the manager. There are 6 administrators from each type of school. Six of the schools were selected from low-economic, medium,

and relatively economical regions. Eight of the managers are female and 10 are male. Managers have more than five years of experience, 11 to 5 to 10 years, and 4 to 10 years of management experience.

School income sources

Managers of income sources of primary education schools, income from school-family reunions, voluntary donations, donations received in transcripts and transfers, income from sports theater fees, school theaters and demonstrations, revenues from kermes and festivals, photocopy and examination paper fees, they are trying to provide resources such as the resources they have obtained from the kindergarten of the schools in which they are located. The views of some of the school administrators are;

School-family association contributions, voluntary donations, donations received in transcripts and transcriptions, sports line fees, income from school theaters and shows, revenues from kermes and festivals, photocopy and examination paper fees, the sources of the kindergarten in the schools that have the kindergarten, school services, school dining hall rental, canteen rental

EA-5. Our first source of income is the donation of the lord. The school is demanding a family union.

How do you describe yourself when you generate these revenues?

A good marketer, a good bargain merchant, the person who should be sore, beggar, business owner,

EA-9. We're trying to convince like a full salesman, my child, actually I realize how far I am from my educator identity.

EA-8. It looks like 5 -10.000 TL for someone to look cute every time.

Public support

Electricity, water, certain amounts of fuel (natural gas), telephone and internet payments and certain payments for repair

EA-14. Since we use electricity, water, telephone and internet for approximately 1000-1200 pounds, we transfer the invoices to the system. He's paid in a couple of days.

EA-18. We are paid electricity, water and international, but we have problems in warming up. My school is a large school with just enough gas given weekly. I need support from the parents.

Maintenance and repairs

It has been found that education administrators can not receive public support at adequate levels in maintenance and repair of buildings and classes.

EA-2. When you want to repair from the general budget, it is evaluated on the ground later in the county. If 50-60 schools are applying for general repairs, 5 of them may have the chance this year.

EA-11. It is necessary to care for the building (annual roof, paint the building). You have a source, or you do not.

School stationery expenses

Educational administrators say that the school's stationery expenses are not met publicly and these expenses are covered by donations collected from the students.

EA-4. There is no allowance for teaching-learning services. However, materials can be requested in the form of stationery, toner, photocopy. Sometimes he comes, sometimes he does not. We demand from the students as copy money for us.

Service purchase expenses

Educational administrators say that they are not in sufficient numbers and that the school is in the process of receiving services to meet adequate staff, but that the school is very difficult to do so.

EA-12. The school has a permanent staff. 18 people (security, cleaning, civil servants) are employed as staff with Family Union facilities. We're stuck in their pay. The staff of the school will be able to meet the need, even if no other money is given.

Private school support

They expect to provide education and training support to private schools in public schools as well.

EA-11. Private schools are already getting money from their students. I do not think the state gives money to schools that have no money problems, not their own school.

EA-15. It does not make any sense to fund private schools. If we give half of those funds to state school, we will not deal with such problems at all.

Equality in education

The inequalities between schools have led to the discovery that the student also leads to inequalities in benefiting from educational services.

EA-9. Equality is not possible to provide. Regional and presently varying school income

EA-5. One of the problems faced as a result of school-level politics is the question of equal opportunity and equality in economic terms. We can say that we are collecting money with binary relations.

Problems that create finance in educational administration

Educational administrators have been able to find that they are unable to do educational management, which is their primary task while trying to provide financial support to the school, and that they spend all their time financing the school to live.

EA-1. I am very tired of the helplessness in monetary matters. Schools that do not have monetary inconveniences become more productive.

Discussion

The income sources are increasing or decreasing according to the school environment. While the income sources of the schools in the rich regions are diversifying and multiplying, the diversity of the income sources of the schools in the poor regions is decreasing and even it is the source of the single income.

It seems that educational administrators behave as a merchant trying to manage and live their business by leaving educational administration, which is the primary task of income generation, as an edge. This situation commercializes the relationships in the school and shows that they perceive it as a student / child customer.

Due to the limited public resources in basic education, it may be considered as a disadvantage for these schools that school principals need to look for private resources. Especially at this stage, it is seen as a source of funding for schools. Household education expenditures also support this finding.

Table 1. Household Education Expenditures (2010-2015).

The types of spending by income group share in 20% sequentially, Turkey, 2010-2015		Total	Income group				
			1. %20	2. %20	3. %20	4. %20	5. %20
2010	Educational services	100,0	3,3	6,3	10,7	19,4	60,2
2011	Educational services	100,0	3,3	5,2	11,0	18,2	62,3
2012	Educational services	100,0	2,3	5,6	9,0	16,3	66,8
2013	Educational services	100,0	2,5	6,2	10,8	17,1	63,5
2014 ⁽²⁾	Educational services	100,0	2,2	5,6	10,6	16,9	64,7
2015 ⁽²⁾	Educational services	100,0	1,6	4,3	8,6	16,6	68,9

Source: TURKSTAT, Household Budget Survey 2016.

Starting from 2014, the new administrative division in sampling design has been taken as a basis

With the neo-liberal economic policies and the implementation of educational policies, public investment in education has decreased and on the contrary public support and private schools have been increased. The privatization efforts accelerated especially with the economic decisions of January 24, 1980.

The aim of "restructuring" practices in education is to transform educational administration into a profitable investment. Thus, all stages from the teaching process to what kind of information will be given and how the teacher will behave to the class have been rearranged and transformed the right to education, which is the fundamental human right, into a commodity,

Together with the neoliberal educational policies implemented, education becomes a right and becomes a commodity that can be bought and sold. Both the deterioration in the income distribution and the reduction of public expenditures together with these policies harm the right to education. Education is the only way to turn it into a privilege that can be enjoyed by those who have money. Nevertheless, these privileges in education lead to increased reproduction of inequalities existing in society.

Table 2. Private school support by years

Year	Preschool		Elementary school		Secondary school		High school/Basic High school		Total Student	Total Support Amount
	Number of students to be supported	Support Amount	Number of students to be supported	Destek Miktarı	Number of students to be supported	Support Amount	Number of students to be supported	Support Amount		
2014-2015	50.000	2.500	50.000	3.000	75.000	3.500	75.000	3.250	250.000	765.625.000
2015-2016	20.000	2.680	50.000	3.220	50.000	3.750	110.000	3.750	230.000	770.530.000
2016-2017	6.000	2.860	15.000	3.440	15.000	4.000	15.000	4.000 24.000	3.440 75.000	266.100.000
2017-2018	6.000	3.060	15.000	3.680	15.000	4.280	15.000	4.280 24.000	3.680 75.000	290.200.000

Source: National Education Statistics 2010-2017. Ministry of National Education Publications, Ankara, 2017.

As can be seen from Table 2, public resources are already being transferred to private schools offering paid education services. This resource transferred to private schools expresses that the administrators of public schools should be given to their own schools. This situation further increases inequality in education.

References

- Adem, M. (2008). Eğitim planlaması. Ankara. Ekinoks Yayınları
- Altunay, E. ve Ağaçdiken, Y. E. (2016). İlkokul ve ortaokul öğretmenlerinin eğitim politikasına ilişkin metaforlarının değerlendirilmesi. 12. Ulusal Eğitim Yönetimi Kongresi. 12-14 Mayıs 2016. İzmir.
- Balcı, A. (2007). Sosyal bilimlerde araştırma. Ankara. Pegem Yayınları.
- Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş. ve Demirel, F. (2009). Örneklem yöntemleri bilimsel araştırma yöntemleri. Ankara: Pegem.
- ERG (Eğitim Reformu Girişimi) (2009). Eğitimde eşitlik politika analizi ve öneriler. Türkiye’de Eğitimde Eşitliğin Geliştirilmesi için Verilere Dayalı Savunu” projesi. Açık Toplum Enstitüsü. İstanbul: ERG
- Karakul, A.K. (2014). İran ve Türkiye’de eğitim finansmanının karşılaştırılması. Mehmet Akif Ersoy Üniversitesi Eğitim Fakültesi Dergisi, 31(2).
- Karakütük, K. (2017). Eğitim planlaması. Ankara. Pegem Yayınları.
- Kurul, N. (2012). Eğitim finansmanı. 2. Baskı. Ankara. Siyasal kitabevi.
- Küçükler, E. (2010). Türkiye’de eğitim planlaması neyi hedefliyor? International Conference on New Trends in Education and Their Implications 11-13 November, 2010 Antalya-Turkey.
- Kümbetoğlu, B. (2008). Sosyolojide ve antropolojide niteliksel yöntem ve araştırma. İstanbul: Bağlam Yayıncılık.

- Punch, KF. (2011), sosyal arařtırmalara giriř, çev. D. Bayrak, H. B. Arslan, Z.Akyüz, Ankara: Siyasal Kitabevi.
- Seggie, FN. Ve Bayyurt, Y. (2015). Nitel arařtırma: Yöntem, teknik, analiz ve yaklařımlar. Ankara: Anı Tural Kurul, N. (2002). Eğitim finansmanı. Ankara. Anı yayıncılık.
- Tonbul, Y. (2016). Eğitimin ekonomisi. Eğitim: Pedagoji içinde. (Editör: Erdal Toprakçı). Ankara: Ütopya Yayınevi.
- Türnüklü, A. (2000). Eğitim Bilim Arařtırmalarında Etkin Olarak Kullanılabilecek Nitel Arařtırma Teknięi: Görüşme. Kuram ve Uygulamada Eğitim Yönetimi, 24, 543-559.
- Ünal, L. I. (1996). Eğitim ve yetiřtirme ekonomisi. Ankara. Epar Yayınları.
- Ünver, G., Bümen, N. T. ve Bařbay, M. (2010). Ortaöğretim Alan Öğretmenlięi Tezsiz Yüksek Lisans Derslerine Öğretim Elemanı Bakıřı: Ege Üniversitesi Örneęi. Eğitim ve Bilim Dergisi, 155 (35), 63- 77.
- Yıldırım, A. ve Şimşek, H. (2013). Sosyal bilimlerde nitel arařtırma yöntemleri. Ankara: Seçkin Yayınları.

Opinions Of The Turkish Language And Literature Participants Who Are Registered To The Pedagogical Formation Certificate Program And Who Have Questions About Their Correspondence In Teaching Practice

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Goal; the aim of this study is to determine the problems faced by the students of the Turkish Language and Literature Field registered in the pedagogical formation certificate program in their practice schools in the Teaching Practice course.

The study group; it is a qualitative study based on the opinions of fifteen students enrolled in the program of Abant İzzet Baysal University Faculty of Education Teaching Formation of the graduate student or graduate student of the Department of Turkish Language and Literature in the Second Term of the 2016-2017 Education- .

Data collection tool; The data were collected through a semi-structured interview form with open-ended questions prepared according to the pre-determined theme. Themes, A) Educational and educational problems in the application school: 1. Knowledge of the field, 2. Managing the teaching and learning process (1. Planning, 2. Preparing for the course, 3. Using the teaching principles and methods, 4. Communicating with the students, Classroom management and student relations 6. Students' learning assessment, 7. Self-confidence, B) Administrative problems in the school. Two field experts were consulted for the coverage of the Interview Form which was prepared in accordance with the template. Fifteen student interview forms were applied and fifteen complete interview forms were included in the evaluation.

Analysis of the data; interview forms were carefully monitored for content analysis, 1) coding stage, 2) screening stage, 3) category development stage, 4) validation and reliability assurance phase, and 5) frequency calculation and interpretation phase. In order to ensure the validity and reliability of this qualitative study, the data have been examined in detail. Coding was done by a doctoral student with researcher and qualitative working experience. Miles and Huberman's reliability formula is applied. (Reliability = agreement of opinion / agreement of opinion + difference of opinion) The two codes of opinion were re-assessed and agreed to provide 100/100 views. Coded problems are divided into categories according to pre-determined themes. In the tables prepared according to the hypothesis, the frequencies determined according to the frequency of expression of the two least acknowledged participants of the codes. Care has been taken to reflect the views of the participants as they are. The findings have been tried to be interpreted.

The major findings: Theme1. Area information; Difficulty in not knowing the curriculum program (f = 11) and adapting it to the student level (f = 12) 2. problems with the teaching and learning process; Theme 2.1. Making plans: difficulty in making plans (f = 15); Missing plan (f = 13) Theme 2.2 Preparation for the course; Failure to find appropriate course material for the topic (f = 11), failure to find sources other than the course book (f = 5); theme 2.3. (F = 14), Forcing practice of teaching principles and methods (f = 13) Theme 2. 4. Communicating with students: complaints that students did not listen to themselves (f = 11), Word Talk without getting the right (F = 10) Theme 2.5. Class management and students' relations: The lack of time (f = 14) The inability to collect the attention of the students on the subject (f = 11), the failure to rule the class (f = 9) : No time for the evaluation (f = 12), difficulty in writing the evaluation question (f = 8) D 7. Self-confidence; Very excited (f = 15), theme 3) The main administrative problems they encounter in the practice school are; (F = 15), failure to consult outside the class with the application teachers (f = 14), Failure to consult the application instructor because of the courses they had during the university course (f = 7), Not knowing the administrators apart from the manager = 7), Only seeing the schoolmaster once (f = 7), Appointment with a maximum of two branch teachers (f = 7) except for the application teacher. The identified problems overlap with the research done in this area.

As a result, it can not be said that students from the Teaching Practice course have gained the optimum level of experience. For the solution of students' problems: Teaching Practice lesson should be increased and include at least two academic semesters. Application lecturers and students should be gathered and discussed frequently during the course monitoring and should be aware of the missing lessons with the lessons that will be given to the application students. For example; Planning and implementation according to the objective and achievements of the course, selection of teaching principles and methods in accordance with achievements and subject, conscious use of educational technologies and taking into account individual differences can be taught. Criteria must be

selected carefully in the selection of application instructors and teachers. Implementation students can be introduced to all managers and teachers for positive communication and interaction with their colleagues. In general, attendance at school activities can be provided. They can organize activities with students. Also, It can recommend to make observations about the management process and functioning in the school, to communicate with the managers, to participate in the managerial processes and to accompany the guard teachers.

Opinions Of Undergraduate Freshman Students Of The School For The Handicapped On Career And Career Awareness

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Abstract

It is aimed at this study to examine the knowledge of the career and career awareness of 16 hearing impaired students, newly enrolled in the Graphic and Ceramic Undergraduate Programs of the School for the Handicapped (SfH) of the Anadolu University in the educational year of 2017-2018. According to the research findings, the restructuring studies that are realized in the courses and course contents have been planned according to the research findings. A questionnaire where 41 questions containing 25 closed-ended and 16 open ended answers have taken place, were applied to the students. The questionnaire consists of the sections, titled as “*Personal Information*”, “*Information on Education and School for the Handicapped (SfH) of the Anadolu University*”, “*Acknowledge About –Associate-Definition of Career Conception*” and “*Looking for Employment/Job After Graduation, Finding Job Advertisement and Job Application*”. A descriptive analysis has been used in order to determine the opinion of the hearing-impaired students with relation to the career. It is understood at the research that 68 % of the students do not know about the career conception and 81 %, however, about career planning. It has also been seen that 88 % of the students have taken examination called as E-KPSS (E- Public Personnel Selection Examination) in the career plan and become (public) officers or employees. Furthermore, it has also been understood that 56 % of the students had no knowledge about the documents, required in the job application, and 80 % of them had opinions on the job interview, 13 % had job interview in advance and 13 %, however, were able to write the definition of the job interview correctly. It has been seen that 19 % of the students knew what the job application file was, and 75 % of them knew about the Turkish Employment Agency and thought that they might benefit after their graduation.

Introduction

The career means that the progress of individual in the profession, decided upon by him and acquirement of experience by developing himself. The career process covers the education process of the individual. All stages of the education are a part of the career (Adıgüzel & Erdoğan, 2014; Sharf, 2006; Şimşek & Öge, 2011; Yeşilyaprak, 2012). The career planning, however, is to plan the educations, already taken and due to be taken in advance within the career direction and then, realize the same (Brown & Brooks, 1985; Campbell, 1997; Isaacson & Brown, 2000; Sharf, 2006; Yeşilyaprak, 2012). For making a career planning, it is necessary to search what the processes with relation to the career, determined before all else, namely, to have a career awareness. The individuals having the career awareness make progress faster to their targets when they started to their professional lives (Korukoğlu, 2003; Rae, 2007; Türkoğlu, Gavcar & Büyüksakallı 2013). However when it is focused on the career awareness researches, it is indicated that the individuals do not have sufficient career awareness (Özdeşler, Tarakço & Aslan, 2015; Sharf, 2002). This circumstance shows that the individuals cannot make necessary plans properly for due progress in their profession either. The career planning is an important process for the employment of the individual.

The employment and employability are different concepts. The employment is the work of an individual at a job whether it is related to his career or not and mostly indicates a temporary circumstance. The employability, however, is for the individual to work in a profession, selected by him, in a permanent manner in order to make contribution to himself, workforce, society and economy and a number of skill, knowledge and personal qualifications raising the possibility of his success (Bhaerman & Spill, 1988). In this context, it is important to prepare training environments where it is possible for the individual to acquire skills to increase the possibility of his employability. When the body of literature is examined, it is seen that there are researches determining the career awareness of the hearing and hearing-impaired individuals and clarifying the educational environments to be prepared for raising such awareness, however, they appeared to be not sufficient (Dursun & Aytaç, 2009; İstel, 2018; Karasu, 2018; Kaya, 2017; Kaya, 2012; Kaya, Özten Anay, Abalı, Karasu & Girgin, 2017a; Kaya, Özten Anay, Abalı, Karasu & Girgin, 2017b; Kaya, Özten Anay, Karasu, Abalı & Girgin, 2017; Kozak & Dalkıranoğlu, 2013; Rae, 2007; Sarıkaya & Khorshid, 2009; Yılmaz, Dursun, Pektaş & Altay, 2012).

The economic conditions of our current period have made it necessary for the individuals to make their career planning. It is the legitimate right of the young people to find a job and work at the job, desired by them. However, the individuals work at the jobs wherever they find instead of planning their own career in our country where the rates of unemployment exceed 10 %. The increase of employability is related to making their career planning in a proper manner (Bhaerman & Spill, 1988). Inclusion of the career planning activities in every stage of the education

will help the students to make their career planning for future in a more realistic manner (Bhaerman & Spill, 1988; Sharf, 2002).

The matters of career awareness and employability are the joint problem of all the individuals living at the society whether handicapped or not. Various legal measures have been by the state with regard to the employment of the handicapped (Mevzuat/Regulations, 2003). However, despite of these measures, the placement of the handicapped in employment with regard to their profession where they make career appears to be considerably low and it becomes necessary for them to cope up with various problems at employment environments (Demir & Eliöz, 2016; Derican, 2010; Kaya, Özten Anay & Girgin, 2014; Erdiken, 2005; Erdiken, 2007). The handicapped experience various different problems according to their types and degrees of handicap in looking for a job, finding a job advertisement and working in job processes. The hearing-impaired individuals, however, struggle with various problems both in professional training and employment processes as a result of communication problems, experienced by them as a result of restriction in their languages (Erdiken, 2005; Erdiken, 2007; Kaya, Özten Anay & Girgin, 2014). The hearing-impaired individuals experience difficulties in reading and comprehending texts as a result of their reading-comprehending, writing problems and restricted vocabularies and lag behind from their equals in the education process (Schirmer, 2000). When the researches pertaining to the professional training of the hearing-impaired individuals, it is seen that the professional training has been effective when it is done by the provision of supports in accordance with the requirement and level of the handicapped (İstel, 2018; Karasu & Uzuner, 2018; Karasu, Uzuner & Beral, 2018; Karasu, 2011; Kaya, 2012; Schirmer, 2000; Uzuner, Girgin, Girgin, Erdiken, Karasu, Kaya, Cavkaytar & Tanrıdiler, 2011).

Higher Education Institution in the Hearing-Impaired Individuals: The School for the Handicapped (SfH)

The university education is a part of the professional training and occupies an important place in the career processes with relation to the selected profession. When the hearing-impaired individuals want to get university education in our country, they can get education in all universities, affiliated to the YÖK (Higher Education Council). However, it is necessary for the supports in conformity with their levels of disability to be provided. The “Regulation on the Handicapped Consultancy and Coordination of the Higher Education Institutions”, which was published and entered into force on August 14, 2010 at the Official Gazette having the issue number of 27672, was come in force in order to prepare required academic environment for the facilitation of education lives of handicapped students in higher education processes and ensure their full participation in their education process (YÖK, 2010). The “Handicapped Student Units”, put into force together with the related Regulation, conduct works in order to support the handicapped students in universities. The studies so made may be listed as the recognition of the handicapped students by each university within its structure and development of awareness for the handicapped student, requirement-determination works, planning the works to make the environment free of handicap and determination and solution of problems by organizing meetings with the handicapped students (Kalyon, 2012). However, it has not been put forth how these studies/works so made have affected the educational process of the handicapped individuals. Therefore, it is clear enough that the handicapped students the handicapped individuals especially requiring language support will face immense difficulties in their processes of continuing their educations at universities. Currently, there is one higher education institution, equipped with convenient environment and strategies for the hearing-impaired individuals. The School for the Handicapped of the Anadolu University has kept offering education since 1993 for the handicapped individuals. The SfH currently continues to offer education in four programs; two for undergraduate and another two for associate (two-year) degrees. An average number of 40 hearing-impaired young people graduate from the SfH for each year. The total number of the graduates of the SfH is 497 as of the end of the Spring Semester of 2018. The SfH is the first and only higher education institution in Turkey as of its specialist education cadre both in its field and special education field and at the programs, prepared in conformance to the hearing-impaired individuals.

The level of language skills of the hearing-impaired students are closely related to various number of factors such as type and degree of the hearing handicap and age of becoming a hearing handicapped person and special education, got in that respect. It is not possible to reach such information of the hearing-impaired students, placed in the undergraduate programs of the universities apart from the SfH. Therefore, the degree of hearing handicap and as a consequence, the language level of the hearing-impaired individuals, enrolled in the undergraduate programs, is not known. A great majority of the hearing-impaired students getting education in the SfH have advanced and highly advanced sensori-neural hearing handicap.

It is important to make the career awareness due to take place in their professional trainings in accordance with their language levels in order that the hearing-impaired individuals find place for them at the employment environments. In this respect, it is necessary to integrate the career awareness studies with courses in the professional training processes, support the same with applications and diversify with interdisciplinary studies (Karasu, 2011; Karasu, Uzuner & Beral, 2018; Kaya, 2012; Uzuner at al., 2011). Having knowledge what the

preliminary information for the career awareness of the hearing-impaired young persons, entitled to get university education, will illuminate the development/updating of the studies that are and will be made for the career awareness. It is thought that the findings that are obtained from the study will make contribution to the career awareness and making career planning of the hearing-impaired university students, integrity of the courses at the professional training programs, applications due to be made and diversification of the foregoing through interdisciplinary activities. The general objective of this research is the determination of perceptions of the university students with advanced and very advanced level of hearing-impaired beginning their undergraduate education processes, on the career and career planning. The research questions within the direction of this objective are as follows:

Of the young people, who are the advanced and very advanced level of hearing-impaired, coming from various education environments;

- a) What are the personal characteristics?
- b) What are the educational and SfH information?
- c) What is the preliminary information with relation to the career and career awareness?
- d) What is the career planning for the post-graduation period?

Method

The research where it is aimed to determine how the hearing impaired young persons, who came from different education environments, with the advanced and very advanced level of hearing-impaired, have come to the SfH and their opinions with relation to the career planning of them, is a descriptive analysis. According to this approach, the data, obtained within the research process, are summarized and interpreted within the themes, determined in advance. Direct quotations are given place at the descriptive analysis study in the reporting of the data, obtained at the end of an interview, questionnaire or observation in order to reflect the opinion of the individuals in a striking manner. The objective of the descriptive analysis is to submit the findings so obtained in a regulated and interpreted manner (Yıldırım & Şimşek, 2016).

The research data have been gathered with literature scanning, document scanning, observation, researcher diary, questionnaire process video shootings and questionnaire. The questionnaires are the scales, used for the obtainment of information for objective with the questions, asked to the group that is accepted to be representing a certain universe (Bal, 2001). Open- and closed-ended questions have taken place at the questionnaire, developed in the research.

Participants

The students and research team constitute the participants of the research. According to the official records in our country, only 1.518 out of a total number of 7.010.598 students taking place at the undergraduate and associate degree processes of the higher education as of 2017-2018 educational year, are the hearing-impaired (YÖK, 2018). It is seen hereunder that only 0,022 % of the number of students taking place at the undergraduate and associate programs are the hearing-impaired. It is indicated in the related reports that the number of students, who enrolled in the undergraduate programs in the educational year of 2017-2018, is 669.367 (YÖK, 2018). In this case, it is possible to say that there are an approximate number of 145 hearing-impaired individuals at the undergraduate programs according to the proportion so determined. The number of students, who enrolled in the undergraduate programs of the School for the Handicapped (SfH) of the Anadolu University in the educational year of 2017-2018, are 22. It is possible to say that an approximate proportion of 15 % of the hearing-impaired students, who newly enrolled in the undergraduate programs of universities, are studying at the SfH. The hearing-impaired information and degree of the remaining 123 students are unknown. In the meantime, there is no information on the language levels of these students available. In this case, it is possible to conclude that the students, enrolled in the SfH, represent the advanced and very advanced level of hearing-impaired students. In this context, 22 hearing-impaired students, who enrolled in the undergraduate programs of the SfH in the educational year of 2017-2018, constitute the universe of our research. A questionnaire has been applied to 16 (73 %) of these students having taken part in the research.

The research team consists of four instructors. The author of the article served duty as the conductor of the research. All instructors have taken place in the collection of data, their analysis and validity studies.

The research is limited by the 16 advanced and very advanced level of hearing-impaired students, for whom the data are gathered.

Data Collection Techniques and Analysis

The questionnaire that has been prepared in order to bring the opinions of hearing-impaired undergraduate students about the career and career awareness and to learn about the opinions of the students was applied to the undergraduate students, who newly began the SfH in the educational year of 2017-2018 at class environment. The questionnaire that has been prepared at the computer media and adopted to the language level of the handicapped students upon regulation was applied in three sessions on the dates of 03-06-07/11/2017. The questionnaire has been filled in at the class environment. While the questionnaires were answered at the class, the researchers responsible for the application of the questionnaire have taken place beside the students. No time limitation has been given for filling in the questionnaire. The questionnaire has been filled in with individual supports, given by the researchers to the students. The validity study of the questionnaire has been carried out by three academic members, experienced on research methods and specialists in the hearing-impaired individuals. A total number of 41 questions were taken place at the developed questionnaire where there were 25 closed-ended and 16 open-ended questions. The developed questionnaire contained the following topics: *“Personal Information”*, *“Information on Education and School for the Handicapped (SfH) of the Anadolu University”*, *“Acknowledge About –Associate-Definition of Career Conception”* and *“Looking for Employment/Job After Graduation, Finding Job Advertisement and Job Application”*.

The hearing-impaired students, who participated in the research, show a dispersion of 8 females (50 %) and 8 males (50 %) in consideration of sex. The students of the graphic 1st Class, Ceramic 1st Class and Preparatory class students in Turkish (language) have answered the questionnaire in different sessions. The descriptive analysis techniques have been used in the analysis of data, gathered in the direction of the questionnaire and prepared for the objective. Each section-taking place in the questionnaire has been analysed within itself.

The students have been informed about the content and application of the research in the questionnaire sessions and written permission letters were taken from the students. All of the students have participated in the research voluntarily. A camera record has been made after the collection of letters of permission. The questionnaire answering process has been jointly participated by an instructor, who knows sign language, and special training experts. A group and individual support study has been made for the comprehension of questions by the students in advance of answering the questionnaire.

Any question that is not understood and asked by a student for clarification was explained firstly to the student and then, to the class and by doing so, it was tried to ensure the equality. The video record of all questions so explained has been taken. It has been tried to make same explanations in all sessions. The problems and suggestions, experienced in the process are entered in the diary of the researcher (Figure 1).



Figure 1: Participant Students in the Questionnaire Session

Findings

The findings at this section of the research will be presented under the topic of the research questions. The questions of the questionnaire under the research questions and students' answers will be interpreted within the direction of the objectives and transmitted accordingly.

a) What are the Personal Characteristics of the Students Studying in the Undergraduate Programs of the SfH?

Relevant questions on *demographic information, looking or a job and working in a job* take place at the "Personal Information" section of the questionnaire. There are a total number of 20 questions take place at this section.

Demographic Information

The average age of the students is 21. In this respect, 9 (56 %) of the students are enrolled in the Ceramic and 7 (44%) however, in the Graphic department. While 3 (19 %) of the students use cochlear implant, 13 (81 %) students, however, use hearing aid. While 9 (70 %) of the students wearing hearing aid uses their devices in a regular manner, the remaining students said that they do not wear their devices in a regular manner. When it is looked at the reasons of not wearing the devices, however, the information such as disturbed by noise, headache and failure to get sufficient training was given. 2 (13 %) students have not answered this question. The personal information of the students, participated in the research, take place at the Table 1.

The effect of having a hearing-impairment is a known fact on the skills of using the language (Kretschmer & Kretschmer, 1988). When the ages of the hearing-impairment ages of the students are taken into consideration, it has been understood that 10 (63 %) students are the hearing-impaired inborn, 3 (19 %) are at the age of 1, 2 (13 %) at the age of 8 and 1 student, however, at the age of 11. Within the light of these data, the ages of 13 (81 %) students when the hearing-impairment started have similar natures. It has been understood that 3 (19 %) students have become hearing- impaired after the language acquirement age. This circumstance shows that the language levels of these three students have been more developed and rich in comparison with the others. Showing a conspicuous difference of the answers of these students in comparison with others is an expected circumstance. When the hearing impairments of the students are classified, it has been understood that 13 (81 %) of the students are subject to very advanced, 2 (13 %) advanced level and 1 (6 %) student, however, at medium level hearing-impairment (WHO, 2018).

Table: 1 – Characteristics of the Participant Students

Department/Class	Student	The Cause of Hearing Loss /Age	Hearing Loss (dBHL)	
			Right	Left
Ceramic/ Intensive Turkish Program	M.Ç.	Congenital	116	120
Ceramic/1	C.K.	Congenital	96	100
Ceramic /1	T.K.	Congenital	105	108
Ceramic/ Intensive Turkish Program	S.K.	Congenital	105	102
Ceramic /1	Y.Y.	Congenital	105	110
Ceramic /1	E.K.	Disease/Age 1	97	103
Ceramic /1	Z.İ.	Congenital	71	73
Ceramic /1	İ.B.	Congenital	71	73
Ceramic /1	Ü.B.	Congenital	105	95
Graphic/ Intensive Turkish Program	H.T.	Unknown/Age 1	105	102
Graphic/ Intensive Turkish Program	İ.B.	Congenital	116	118
Graphic/ Intensive Turkish Program	E.B.	Congenital	116	118
Graphic /1	G.E.	Sudden Hearing Loss/Age 8	110	110
Graphic /1	M.H.	Meningitis /Age 8	110	107
Graphic /1	U.A.	Meningitis /Age 11	107	108
Graphic /1	R.G.	Disease/Age 1	68	68

Information on Looking for a Job and Working in a Job

There are 3 questions with relation to this topic: "Did you look for a job before arrival in the school?", If the

answer is YES, please explain it. What have you done when looked for a job? Did you work before you came to the school? If the answer is YES, please say where you worked?

When the questionnaire data are examined, it has been determined that 8 (50 %) of the students were looking for a job and 8 (50 %), however, did not look for a job. The students, who looked for a job, were asked what they have done while looking for a job. Only 4 (26 %) of these students answered this question. 2 students said that they went to the İşkur (Turkish Employment Agency) and 1 student said that he gets support from his family and 1 student, however, the CV. The other students did not answer the question. It has been determined that the students, who have worked before he came to the school, were 9 (56 %).

b) What are the Educational and SfH Information of the Students Studying in the SfH Undergraduate Programs?

It has been understood in this section of the questionnaire where the questions for the educational information of the students take place that 11 students (69 %) have taken pre-school education and 5 (31 %), however, not taken the said pre-school education. It is seen that 9 (56 %) students have taken education at the “Day Special Education” and 1 student at the “Special Boarding School” and 5 (31 %) students, however, have taken education in the “Inclusion” environment. 1 (6 %) student did not answer this question. 2 (13 %) students, who have taken education at the day special education environment indicated that they passed to the inclusion environment. It is seen that at the secondary education processes, however, 10 (63 %) students have taken education at the Day Special Education” institution, and 2 (13 %) students at the “Special Boarding School” and 5 (31 %) students, however, have taken education in the “Inclusion” environment. 1 student did not answer this question (Figure 2).

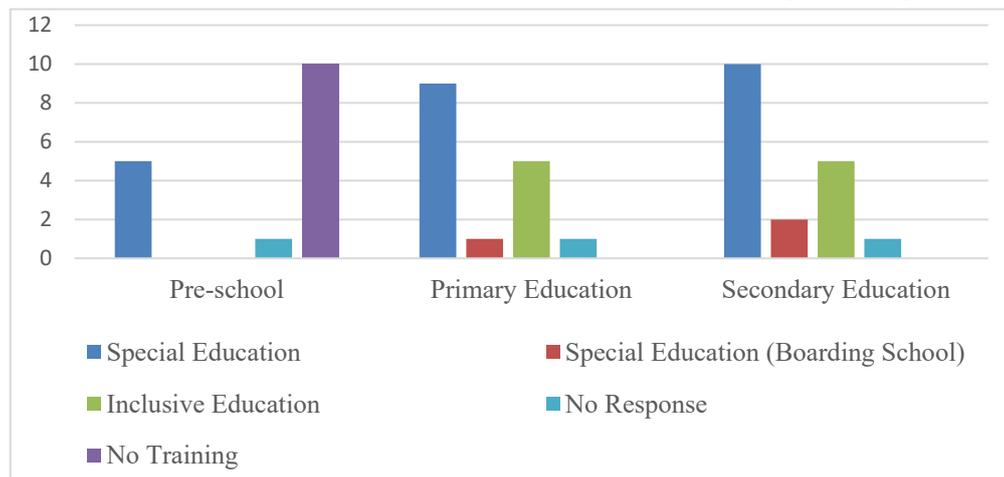


Figure: 2 – Educational Background of the Students

The questions such as: “where did you learn about the School for the Handicapped (SfH)? Did you plan to come to this school? If yes, what did you do? And “What might you do if this school was not available? have taken place at the questionnaire in order to learn about the causes for the selection of the SfH for undergraduate education and whether the university education have taken place at their career planning and for undergraduate education with relation to the career awareness of the students.

The objective of the first question is to get information about the recognition of the SfH. According to the findings so found, the aim is to determine the environments where the recognition of the School for the Handicapped (SfH) and plan the studies. It is indicated in this question that more than one alternative may be ticked. When the answers are examined, it has been seen that 5 (31 %) students ticked that they have learned from the internet”, 3 (19 %) students “Guidance Research Units” and 15 other students, however, ticked as learned from “friend”. According to the data, the unit where the maximum number of data has been taken on were “friends” the SfH. In any meetings, conducted with the students after the questionnaire, it has been understood that the students had friends, graduated from the SfH or currently studying and they set up contact with them about the school. It has been seen that the rate of guidance of the hearing-impaired students by the Guidance Units taking place at the secondary education institutions to the university environments, especially to the SfH, have been considerably low. Within the lights of these data, it has been decided to carry out informative works with the personnel and managers serving duties at the Guidance Research Units taking place at the secondary education institutions and special education vocational high school having hearing-impaired students within their structure, and to take the trips for school introduction to the special education vocational high schools where the hearing-impaired students take place, on the agenda again.

The student were asked *whether they have planned to come to the SfH in advance* in order to understand if an university education was available in their career planning targets or not. While 12 (75 %) of the students answered this question by “Yes”, 3 (19 %) gave the answer “No”, 1 student did not answer it. 12 students, who gave the answer “Yes”, were asked to write down what they have done in order to come to the SfH. 8 students among 12 have understood and replied the question why. The explanations, written down, by them were that they wanted to read university and their friends were studying as well and therefore, they wanted to come. A few examples to the answers of the students:

- I want to learn about the courses a lot.
- I want to attend in a school like university.
- I like graphic and art and work for it, I see them in order to find at Internet.
- I previously came and saw the Eskişehir University with my mother, father and sibling. I wanted to study at this school.

They were asked a question of “*What would you do if that school was not available?*” in order to understand that the hearing-impaired young persons had any plans to take education in another university if the SfH did not exist or continue their education. They were requested to give an open-ended answer. This question was answered by all students. 1 student said he didn’t know anything about it. 8 (50 %) students indicated that they would work, 5 (31 %) of them said that they would not study, 1 (2 %) would stay at home and 1 (2 %) however, study in another school. When the personal information of the student, who said that he would study in another school, it was understood that he became hearing-impaired at the age of 11 and was able to target an alternative apart from the SfH as a result of the fact that his communication skills were close to normal students. However, the other students did not have any plans of studying in another university apart from the SfH. This is clearly understood from the answers of the students:

- .. Comfortable at home.
- I worked at a job
- I would not study. I did not have any intention of studying in advance. I would be an officer through the KPSS (E- Public Personnel Selection Examination).
- If not available, there would be no intention to go to another school and develop communication.
- Very difficult for me because a normal school is not convenient for me. I would write a petition to the Ministry of National Education.

c) What Are the Preliminary Information Levels with relation to the “Career” and “Career Awareness”?

There are 6 questions in this section. 2 (33 %) of the questions were open-ended and 4 (67 %), however, as multiple-choice questions. 2 of the questions, prepared as multiple-choice, contain an explanation indicating that open-ended answers might be written in.

Question 28. “Do you know about the meaning of the word career? (Yes/No)

The first question was prepared as a kind of Yes/No question. There are 6 (38 %) “Yes” and 10 (63 %) “No” answers. According to the questionnaire data, it is seen that the knowledge of the students about the wording “career” is limited.

Question 29. If your answer is yes, “where do you know about the wording “career”?” (You can click more than one choice)

The students, who gave the answer “Yes”, were asked to click where they knew about the career wording. It has been indicated that it would be possible to click more than one choices taking place at the question. The dispersion in the Figure 3 is seen when the answers are examined.

Based on the answers, it is understood that the internet media is an important means in the comprehension of the wording “career”. It is understood that the preliminary information with relation to the career is mostly acquired from the internet and school. 6 students answered the section “*Explain*” taking place in the choices of the question. When the said answers are examined, it is seen that 1 student made a proper career definition, 1 student answered it by using the answers of the next question and 1 student, however, wrote that he did not know about the answer and would make a search about it. The student, who gave the proper/correct answer indicated as follows: “Career means to determine the future in your life, and think about what kind of job, work and so on will be done.” It is seen how good he used the language in his said answer. The student, who gave the answer, has been a hearing-impaired at the age of 11. This matter clarifies that he comes forth as different from other students in respect of reading and comprehension skills.

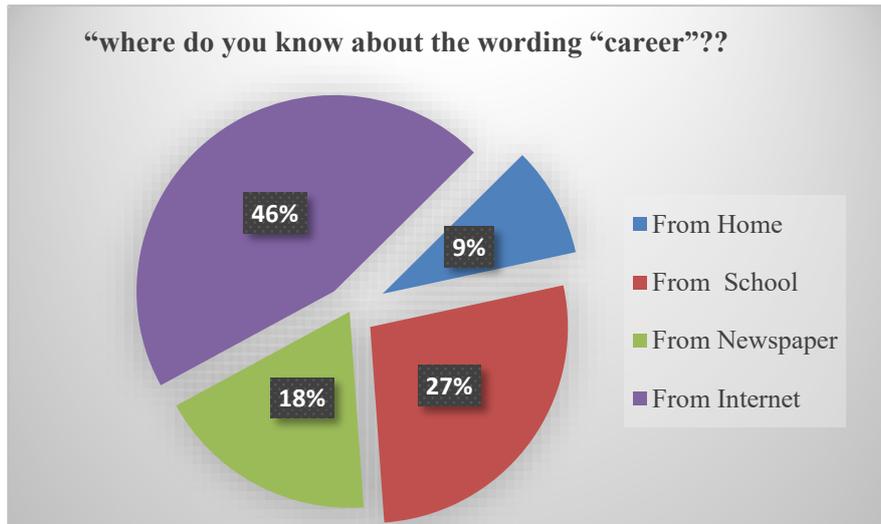


Figure 3 – The Sources of Career Information of the Participants

Question 30. In your opinion, which of the following the career may be related to?

According to the questionnaire results, 10 (63 %) students have answered this question. The dispersion of the students having giving answers is seen at the Figure 4.

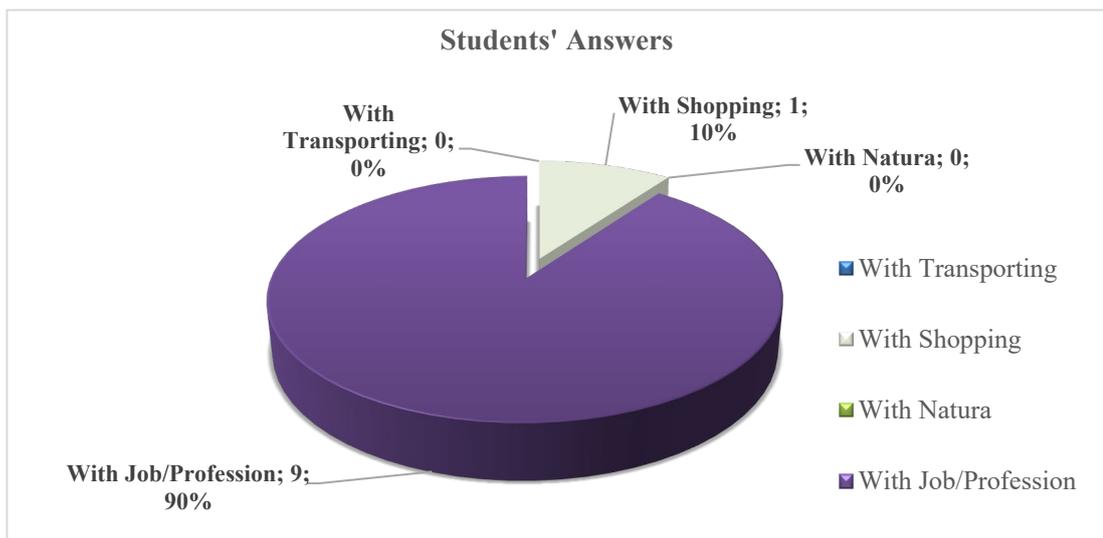


Figure 4 – Opinions of the Participants about the Question 30

Upon examination of answers, it is seen that 9 (90 %) students gave the answer of “with job/profession) and the answer “with shopping”, however, is ticked by 1 (10 %) student. Other choices have not been ticked. On the basis of this question, it is understood that the students could associate the wording career with the job/profession. It is understood from the answer of the student, who gave the answer “with shopping”, saying “Looking for a job with shopping, career is working.” That he confused the wording “career” with the wording of “cashier”.

Question 31. What does career mean in your opinion? Please write down.

The question is open-ended. The definition of the wording “career” is required to be written down. 10 (63 %) students have given answers to the question. 1 student among those, who answered, has given an answer by confusing the wording with the word “cashier”. Among the remaining 9 students; 3 (33 %) gave their answers as “job”, 2 (22 %) as “looking for a job”, 1 (11 %) “İŞKUR (Turkish Employment Agency)” and 1 (11 %), however, as “workplace”. It is seen when the answers are examined that only 2 students gave the correct answers to the question. The examples from the answers of the students are indicated as follows:

- It is something like the İşkur but I have no knowledge about it.
- For a person exercising a profession, desired by it.
- It means for work.
- Market queue the career working.

Question 32. “Do you have any knowledge about the Career Planning?” (Yes/No)

It is aimed in the question to understand whether the student has any knowledge about “Career Planning”. Giving answer to the question as “Yes/No”; those having answered the question as “Yes” were expected to write an explanation with relation to the “career planning” at the explanation section. It is seen when the questionnaires were examined that 3 (19 %) students gave the answer as “Yes”, 9 (56 %) as “No” and 4 (25 %) students, however, did not give any answer. 2 of 3 students, who gave the answer “Yes” written down information at the explanation section. It is seen that both of the students, who wrote down their answers, have written correct information. It is understood according to the data that 88 % of the students did not know about the wording “career planning”. Furthermore, it is also understood that linguistic skills of the students, who gave correct answers to the question, are better than other students as a result of the fact that they had the hearing-impairment at the ages of 8 and 11. The answers were as follows:

- We plan our field, what we will do in future and in what job we will work.
- It means aiming better targets and achieving the targeted objective.

Question 33. Do you have any career planning? If yes, what is it?

The question has been prepared as open-ended. 7 (44 %) of 16 students having participated in the research answered the question. When the answers were examined, it has been seen that 4 students having given answer have written down the answer of “I don’t know”. Only 2 (13 %) students have written correct explanations to the question. The same students have answered the 32nd and 33rd questions correctly. The answers, given by the students are as follows:

- Yes, I have career planning too. I want to take an undergraduate study for four years at the university and become successful at the E-KPSS (E- Public Personnel Selection Examination) and to be a civil servant and on the other hand, a graphic designer. My field of interest for the current period is the graphic designing, photography and communication.
- Yes, I have career planning. I want to run my own business after getting experience in a corporate firm.

d) What Are the Career Plans for the Post-Graduation Period?

The questions pertaining to the career plans of the students take place at this section. There are 8 questions in this section. 5 of the questions were prepared as open-ended. 2 of them were multiple-choice and 1, however, “Yes/No” question. The multiple-choice questions have explanatory sections.

Question 34. What do you want to do when you complete/graduated from the school?

The aim of the question is to acquire information on the career plans of the students for the graduation. There are 5 choices at the question. Furthermore, a space is left where he can write his own answer as an alternative. It is indicated in this question that the students may tick more than one answer. All students answered this question (Figure 5). The alternative “I never thought about it” was not ticked.

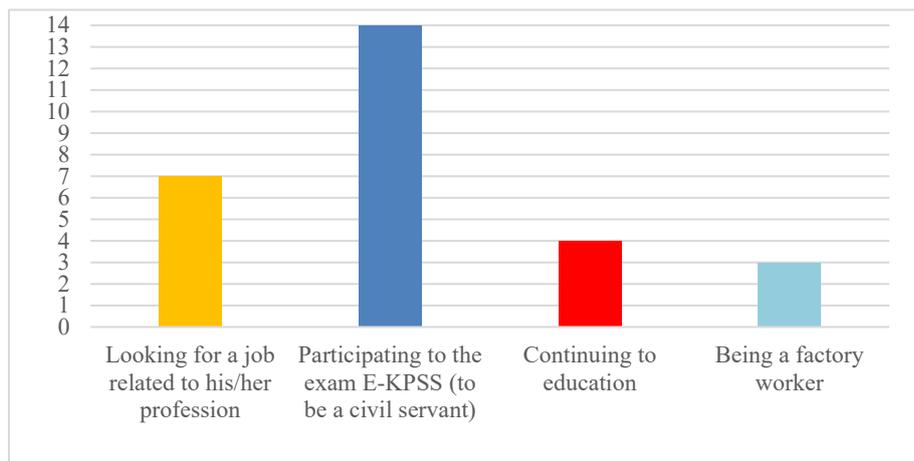


Figure 5: Opinions of the Participants about their Career Plans

Only one student contributed to the question by adding an article to it. The student indicated that he could work in a municipality. When the answers of the students are examined, it will be seen that 88 % of the students ticked the choice of “I will participate in the E-KPSS (E- Public Personnel Selection Examination) and become a civil servant”

Question 35. How do you look for a job when you finish your school?

The question is prepared as a multiple-choice question. It is indicated that the students can tick more than one answer. The dispersion of the student's answers is seen at the Figure 6.

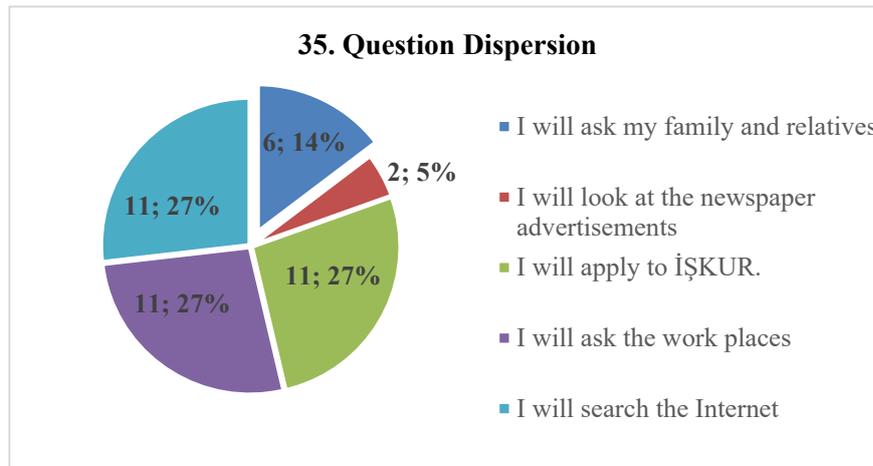


Figure 6: Opinions of the Participants about the method of Job Searching

It is seen according to the questionnaire data that the students ticked the choice of “*I will look at the newspaper advertisements*” with the lowest rate (2.5 %) to look for a job after their graduation. Within the direction of data, it is decided for seeking and finding a job to dwell at the courses with regard to the career awareness, conducted within the process of courses, upon the importance of job advertisements taking place at newspapers.

Question 36. Which documents are used in the job application?

The question is prepared as open-ended. All students answered the question. While 2 (13 %) of the students indicated that they did not know about it, 4 (25 %) students gave answers that are not related to the question. 2 (13 %) students said that they would get their diplomas and make job application, and 1 (6 %) student, however, said that his family might help him. The remaining 7 (44 %) students, however, gave correct answer by writing the names of documents such as CV, report and so on, correctly. Some of the answers of the students are as follows:

- Handicapped report or internship document school document training field document available.
- Diploma, health report, identity card photocopy, photograph and military service document.
- Curriculum Vitae – CV Recorded, signature
- Like the list, but I understood little.
- Diploma document to computer at the job application.

Question 37. What are done in a job interview?

The question, prepared as open-ended, was answered by 13 (81 %) students. 11 (69 %) students made the definitions of their employment experience or job interview. 2 students have given correct answer to the question. It is understood when the answers of the questionnaire are looked at that 80 % of the students have knowledge about job interview, 13 % of them experienced a job interview before and again, 13 % of the same could write the definition of the job interview. Some examples to the answers of the students are as follows:

- Do not speak like an interview, if we agreed upon, my family takes it.
- Talking about the job, then, how to look for job afterwards....?
- Interview and training are made.
- I made an application through internet and they called me a week later and we had an interview.

38. Question. What is a job application file?

The question was prepared as open-ended. The job application file is the file where necessary documents take place in during the job application. It is aimed to learn about what the file is and what is available in it. 10 (63 %) have given answer to the question. It is seen that 19 % of the students have answered the question correctly. Some of the answers of the students are as follows:

- All documents of the person identity card photocopy, photograph diploma. It is the file where documents such as military service are available.
- Something important necessary.
- I will give everything when the your form and list are brought it.

Question 39. What does a CV mean?

10 (63 %) of the students answered the question correctly. 6 (38 %) students did not answer or wrote down that it is not known to him. "The "Curriculum Vitae" answer is accepted as correct. Only 2 (13 %) students made a correct definition of CV in this question.

Question 40. Do you know about the "İŞKUR" (Turkish Employment Agency)? (Yes/No)

12 (75 %) students answered the question by "Yes" and 4 (25 %) students, however, by "No". It is understood from the data that 75 % of the undergraduate students had knowledge about the İŞKUR and could benefit from it after their graduation.

Question 41. What does the "İŞKUR" do?

The students are expected to give an open-ended answer to the question, prepared in order to learn about to what degree the students have knowledge about the İŞKUR. 12 (75 %) have answered the question. It has been understood that 10 (63 %) of the students could described the İŞKUR correctly and 2 students, however, mentioned about their own experiences.

Discussion and Conclusions

It is tried within the scope of the research to put forth the demographic information, SfH preferences, their opinions on the career and career awareness of 16 hearing-impaired students studying at the undergraduate programs of the School for the Handicapped (SfH) of the Anadolu University, located in Eskişehir province, according to the questionnaire questions, applied in this respect.

It has come forth within the direction of a descriptive analysis so made that;

- Those of hearing impaired students, who preferred the SfH and acquired the right of studying there were the advanced and very advanced level of hearing-impaired individuals;
- The hearing-impaired students regarded the SfH as an important, even further the only opportunity for the higher education process of their careers, and thought that they would not study or were going to work if the SfH was not available;
- The advanced and very advanced level of hearing-impaired students had knowledge about the SfH that have taken place in their career plans through their friends, and the Guidance Research Units remained at the background on the subject matter thereof;
- The hearing-impaired undergraduate students had limited knowledge with relation to their careers and career planning, and could not write answer(s) with relation to the concepts because of insufficiencies in their vocabulary, however, could manage to associate the career and career awareness with the job and profession.
- It is an important target for the bachelors to be graduated from the SfH to be successful at the E-KPSS (E-Public Personnel Selection Examination) and find a job at the public sector;
- They had knowledge about the CV that is one of the necessary and important documents for the job application, however, this knowledge was limited;
- They had limited knowledge about job interview; and
- The İŞKUR (Turkish Employment Agency) that is an important institution on the placement in job is known by the hearing-impaired undergraduate students.

It is understood according to the research results that the majority of the individuals studying at the SfH is consisted of the advanced and very advanced level of hearing-impaired individuals. The reading and comprehension problems of the advanced and very advanced level of hearing-impaired individuals come forth as an important obstacle in their educations at university level. Before all else, they experience difficulties to achieve necessary success points for placement in the related university programs. Various works have been carried out at the SfH for the hearing-impaired students in order to enable them to take place in university programs. One of these works is related to the student acceptance through preliminary enrolment and special talent. In 2013, a condition indicating "It is necessary to have at least one of the YGS (Transition to Higher Education Examination) be 100 or over, provided that the handicapped students (physically handicapped, visually-handicapped, hearing-impaired, autism) proved that they are handicapped, at the programs accepting students by a special talent examination" was added I the 2014 Student Selection and Placement Examination through the correspondences and catch-up works between the SfH and ÖSYM (Assessment Selection and Placement Centre) (OSYS, 2014). In the continuation of the decision, it was resolved in a meeting of the General Board of Higher Education on September 25, 2014 to make the enrolments of the students, who won the talent examination by the assessment according to the result of a separate talent examination between them without taking the YGS (Transition to Higher Education Examination) into consideration, to the programs taking the handicapped students through a special talent examination (OSYS, 2015). This case has speeded up both the flow of students to the School for the Handicapped (SfH) and facilitated

the placement of the handicapped individuals in the programs apart from the SfH. There has been sufficient number of student applications since 2014 to fill in the quotas of the undergraduate programs of the SfH. This circumstance is an important opportunity from the point of placement of the hearing-impaired students in the SfH that comes forth as an important opportunity for taking undergraduate education. However, the placement in the programs is not sufficient. It is necessary to evaluate the higher education processes well and to prepare and support environments for raising both profession and language experience knowledge of the students (Uzuner et al., 2011, Karasu, 2011; Karasu, 2017; Kaya, 2012; Kaya, Özten Anay & Girgin, 2014).

According to the result of the questionnaire, it is understood that the students at the undergraduate programs of the SfH prefer the SfH in order to get education at higher education level in the undergraduate programs of the SfH and they have no other studying plans at a different higher education institution. From the point of view of the higher education school that is sole institution in its field of engagement, this is an important opportunity for the higher education of the hearing-impaired students. However, it is necessary to open new higher education institutions in order to increase the hearing-impaired individuals taking place in the higher education and to make the educated individuals be acquired by the economy. In this context, the researches, made with relation to the teaching and teaching methods at the SfH will play a guiding role for the establishment of new departments.

The results of the questionnaire give some clues with relation to the career and career awareness of the hearing-impaired undergraduate students. However, there is a requirement for the diversification of data and method of research in order to put forth the problems and pertaining solutions. According to the results of the questionnaire, notwithstanding that the hearing-impaired students do not know about the meaning of the wording "career", it is seen that they could make correct estimations when the choices and clues are given. It is understood that the practice of employment or internship by some of the students in advance of the school give ideas for workplaces and recruitment. However, the permanence of this knowledge for the hearing-impaired students will be realized by the repetition of the same in various contexts and significant environments (Paul, 1998; Rupley, Blair & Nichols, 2009). It is possible to say that the studies, carried out with the final class students on the matters of raising the career awareness at the higher education school and learning about the techniques of applying for a job, provides an important source on this matter. It is understood to be necessary to make these studies, made within the lights of information being obtained from the questionnaire results, in previous classes as well.

The opinions of 88 % of the students, enrolled in the undergraduate programs of the SfH, about the placement in a job through E-KPSS (E- Public Personnel Selection Examination); it is sufficient for the students to find a job at the public sector and they have no willing to work in own their field of profession. It is very limited for the graduates of fine arts departments such as Graphic, Ceramic and so on, to find a job opportunity in their field at the public sector. Whereas there are lots of job opportunities at the private sector in these fields. However, as a result of lack of sufficient knowledge and experience of the hearing-impaired undergraduate students to look for job and find job advertisement, it is possible to say that they want to take part in the E-KPSS (E-Public Personnel Selection Examination) and place in a job immediately. Therefore, the studies to be made with the hearing-impaired students in this direction are important from the point of view of employability of them. Various positive developments are made at this stage through the studies, conducted at the Higher Education School.

It is understood as a consequence of the questionnaire results that the İŞKUR is known about by the hearing-impaired undergraduate students. However, it is necessary to teach the effective use of the İŞKUR in order to find a job.

The questionnaire results show that the diversification of activities for increasing the career development and employability such as looking for a job, finding job advertisement, application for a job, job interview, getting to know about the workplaces and so on, conducted at the SfH and keeping on making the same in lower classes will be beneficial and important.

References

- Adıguzel, I & Erdogan, A. (2014). *Anne Roe ve Holland'in kişilik kuramları ile Shein'in kariyer değerlerinin içerik analizi yöntemiyle değerlendirilmesi*. International Journal of Alanya Faculty of Business. 6(3). 15-25.
- Bal, H. (2001). *Bilimsel araştırma yöntem ve teknikleri*. Süleyman Demirel Üniversitesi Yayınları. Yayın No:20, Isparta.
- Bhaerman, R. Spill, D. (1988). *A Dialogue on Employability Skills: How Can They Be Taught?*, Journal of Career Development (Springer Science & Business Media B.V.). Fall1988, Vol. 15 Issue 1, p41-52. 12p
- Brown, D. & Brooks, L. (1985). *Career choice and development*. San Francisco, London. Jossey-Bass Publisher.
- Campbell, C.P. (1997). *Training the workforce: an alternate approach*. Vocational-Technical Education

- Conference, Lousville. 2-26.
- Demir, A.Z. & Eliöz, M. (2016). *Engelli bireylerin eğitim ve istihdamı için bir model Önerisi*. ASOS Journal, Akademik Sosyal Araştırmalar Dergisi, Yıl:4, Sayı:33, Kasım 2016, S. 76-90.
- Derican, T. (2010). *İşitme engelli gençlere iş başvurusu dosyası (Portfolyo) geliştirme çalışmalarının incelenmesi: Eylem araştırması*. Yayınlanmamış Yüksek Lisans Tezi. Dumlupınar Üniversitesi, Kütahya.
- Dursun, S & Aytaç, S. (2009). *Üniversite öğrencileri arasında işsizlik kaygısı*. Uludağ Üniversitesi İktisadi ve İdari Bilimler Fakültesi Dergisi, 28(1), 71-84.
- Erdiken, B. (2005). *Anadolu Üniversitesi Engelliler Entegre Yüksekokulu'ndan mezun olmuş işitme engelli öğrencilerin istihdamı, iş durumları ve ayrımcılık*. ÖZ-VERİ Dergisi. 2(1), 389-409.
- Erdiken, B. (2007). *Anadolu Üniversitesi Engelliler Entegre Yüksekokul mezunu işitme engelli gençlerin iş durumu: Anket ve eylem araştırması*. ÖZ-VERİ Dergisi, 4(2), 1041-1063.
- Isaacson, L.E. & Brown, D. (2000). *Career information, career counseling, and career development*. USA. Allyn and Bacon.
- İstel, Ç. (2018). *İşitme engelli gençlere uygulanan yapı bilgisi dersinin öğretim sürecinin incelenmesi: eylem araştırması*. Yayınlanmamış Doktora Tezi Üniversitesi Eğitim Bilimleri Enstitüsü, Eskişehir.
- Karasu, G. (2011). *İşitme engelli gençlere uygulanan sözcük dağarcığı geliştirme stratejilerinin incelenmesi*. Yayınlanmamış Doktora Tezi Üniversitesi Eğitim Bilimleri Enstitüsü, Eskişehir.
- Karasu, G. (2017). *İşitme engelli üniversite öğrencileriyle yazma sürecinin incelenmesi*. Anadolu Üniversitesi Bilimsel Araştırma Projeleri. Proje Ana 2015/05E440.
- Karasu, G., Uzuner, Y., & Beral, A. (2018). *İşitme engelli üniversite öğrencilerinin yazma sürecinde uygulanan etkinlik ve stratejilerin incelenmesi*. Ege Eğitim Dergisi / Ege Journal of Education, 19(1), 262-283. Doi: 10.12984/eggedf.343127
- Karasu, G. & Uzuner, Y. (2018). *İşitme Engelli Üniversite Öğrencileriyle Dengeli Okuma Yazma Yaklaşımı ile Gerçekleştirilen Yazma Çalışmalarının İncelenmesi*. Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi, 19(2), 199-232. doi: 10.21565/ozelegitimdergisi.310350
- Kaya, Z. (2017). *İşitme engellilerin mesleki eğitimi için bir bakış: Engelliler entegre yüksekokulu örneği*, Mesleki Bilimler Dergisi, 6 (3): 677 – 688.
- Kaya, Z., Özten Anay.M., Abalı, G., Karasu, G. & Girgin, C. (2017a). *Acquaintance with profession: Using internship as a tool for. hearing-impaired university students*, Contemporary Educational Researches Journal, Volume 07, Issue 3, (2017) 134-143.
- Kaya, Z., Özten Anay.M., Abalı, G., Karasu, G. & Girgin, C. (2017b). *İşitme engelli üniversite öğrencileriyle kariyer planlama: iş yeri ziyareti*, Küreselleşen Dünyada Eğitim. (Ed) Demirel Ö. & Dinçer S.. Pegem İdeks. Ss: 805-818.
- Kaya, Z., Özten Anay.M., Karasu, G., Abalı, G. & Girgin, C. (2017). *On The Way Towards Career Awareness: Interview With Graduates*. Turkish Online Journal of Educational Technology. Special Issue for INTE 2017, November 2017, 658-679.
- Kaya, Z. (2012). *İşitme engelli yüksekokul öğrencilerine bilgisayar yazılımı kullanımının öğretilmesi: eylem araştırması*. Yayınlanmamış Doktora Tezi Üniversitesi Eğitim Bilimleri Enstitüsü, Eskişehir
- Kaya, Z., Özten Anay, M. & Girgin, M., C. (2014). *Anadolu Üniversitesi Engelliler Entegre Yüksekokulu mezunlarının sosyal paylaşım ağları yoluyla izlenmesi süreci*. Abant İzzet Baysal Üniversitesi Eğitim Fakültesi Dergisi, 15 (Özel Sayı), 139-159.
- Kolb, D. A. (1984). *Experiential learning*. New Jersey. Prentice Hall.
- Korukoğlu, A. (2003). *Üniversite öğrencilerinin eğitimden beklentileri "Ege üniversitesi İ.İ.B.F. örneği"*. Süleyman Demirel Üniversitesi İktisadi ve İdari Bilimler Fakültesi, C.8, S.1, pp:79-89.
- Kozak, M. & Dalkiranoglu, T. (2013). *Mezun öğrencilerin kariyer algılamaları: Anadolu üniversitesi örneği*. Anadolu Üniversitesi Sosyal Bilimler Dergisi. 13(1), 41-52.
- Mevzuat. (2003). <http://www.mevzuat.gov.tr/MevzuatMetin/1.5.4857.pdf>. Erişim Tarihi: 08/08/2018.
- OSYS. (2015). <https://dokuman.osym.gov.tr/pdfdokuman/2015/OSYS/2015-OSYSKONTKILAVUZU15072015.pdf>. Erişim Tarihi: 08/08/2018
- OSYS. (2014). <https://dokuman.osym.gov.tr/pdfdokuman/2014/OSYS/Tercih/2014-OSYSKONTKILAVUZU14072014.pdf>. Erişim Tarihi: 08/08/2018
- Özdiñçler, A., Tarakçı, E. & Aslan, Y. (2015). *Fizyoterapi ve rehabilitasyon bölümü öğrencilerinin mesleki farkındalık düzeylerinin incelenmesi*. Sağlık Bilimleri ve Meslekleri Dergisi. Cilt 2, Sayı 2, pp:217-222.
- Paul, V. P. (1998). *Literacy and deafness: The development of reading, writing and literate thought*. Boston: Allyn and Bacon
- Rae, D. (2007). *Connecting enterprise and graduate employability: Challenges to the higher education culture and curriculum?*. Education + Training. Vol. 49 Issue: 8/9, pp.605-619, <https://www.emeraldinsight.com/doi/pdfplus/10.1108/00400910710834049>, Erişim Tarihi, 31/07/2018.
- Rupley, W. H., Blair, T. R. & Nichols, W. D. (2009). *Effective Reading Instruction for Struggling Readers: The Role of Direct/Explicit Teaching*. *Reading and Writing Quarterly*. 25. 125-138.

- Sarikaya, T. & Khorshid, L. (2009). *Universite ogrencilerinin meslek seçimini etkileyen etmenlerin incelenmesi: universite ogrencilerinin meslek seçimi*. Turk Eğitim Bilimler Dergisi. 7(2). 393-423.
- Sharf, R. S. (2006). *Applying career development theory to counseling*. USA: Brooks/Cole Thomson Learning.
- Şimşek, M.Ş & Öge, H.S. (2011) *Kariyer yönetimi*. Eğitim Akademi Yayınları. ISBN:9786054392377. 281-305.
- Schirmer, R. B. (2000). *Language and literacy development in children who are deaf*. Boston: Allyn and Bacon, Inc.
- Türkoğlu, T., Gavcar, E & Büyüksakallı, H. (2013). *Meslek yüksekokul öğrencilerinin program tercihlerinde farkındalık düzeylerinin belirlenmesine yönelik bir Araştırma*. Electronic Journal of Vocational Colleges (pp:98-106). December, Özel Sayı.
- Uzuner, Y., Girgin, Ü., Kaya, Z., Karasu, G., Girgin, C., Erdiken, B., Cavkaytar, S. ve Tanrıdiler, A. (2011). *İşitme engelli gençlere uygulanan dengeli okuma-yazma öğretimi modelinin incelenmesi*. Kuram ve Uygulamada Eğitim Bilimleri. 11(4), 2111-2132.
- Yeşilyaprak, B. (2016). *Mesleki rehberlik ve kariyer danışmanlığı kuramdan uygulamaya*. Pegem Akademi. Ankara.
- WHO. (2018). *Prevention of blindness and deafness*.
http://www.who.int/pbd/deafness/hearing_impairment_grades/en/. Erişim Tarihi: 13/08/2018
- Yeşilyaprak, M. (2012). *Mesleki rehberlik ve kariyer danışmanlığında paradigma değişimi ve Türkiye açısından sonuçlar: geçmişten geleceği yönelik bir değerlendirme*. Kuram ve Uygulamada Eğitim Bilimleri. 12(1). 97-118.
- Yıldırım, A. & Şimşek, H. (2016). *Sosyal Bilimlerde Nitel Araştırma Yöntemleri*. Seçkin Yayıncılık, Ankara.
- Yılmaz, I.A., Dursun, B., Pektas, K. & Altay, A. (2012). *Universite ogrencilerinin kariyer secimlerinin demografik ozellikler acisindan incelenmesi: Pinarhisar MYO Ornegi*. Electronic Journal of Vocational Colleges. and education: Instructional implications and applications of sociohistorical psychology (pp.111-126). Cambridge, MA: Cambridge University.
- Yüksek Öğretim Kurumu. (2010). *Bilgi Sistemi*. <https://istatistik.yok.gov.tr/>. Erişim tarihi: 31/07/2018
- YOK, Bilgi Sistemi. (2018). *Bilgi Sistemi*. <https://istatistik.yok.gov.tr/>. Erişim tarihi: 31/07/2018.

Parents' Experiences About Their Child's Type 1 Diabetes

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Abstract

Introduction: Type 1 Diabetes Mellitus is a chronic disease that is expanding and increasingly affects children and adolescents, resulting in changes in their lifestyle as well as in their families. **Objective:** To identify the experiences of parents regarding their child's Diabetes Mellitus. **Methods:** Qualitative, phenomenological study, having as participants 14 parents of children and adolescents who have diabetes and are followed up in consultations. We used the semi-structured interview and carried out content analysis. **Results:** Diabetes in children leads to a family restructuring and in particular to changes in diet and relationships with other children; represents a load of negative feelings and fears that lead to the demand for new parental skills and to the appreciation of health professionals and supports received. **Conclusions:** The results can help health professionals in the development of parental role, namely in accepting and adapting to the disease, in overcoming the difficulties and, above all, in improving the family's quality of life.

Introduction

The scientific and technological development has allowed the diagnosis of chronic diseases to be made increasingly early. Thus, an adequate therapeutic plan can be designed in order to control the evolution of the disease. Although early diagnosis does not prevent the onset of the disease, it contributes to a favourable outcome, preventing risks and complications (Gregory, Moore, & Simmons, 2013). Type 1 Diabetes Mellitus is a chronic, complex, and difficult to control disease that interferes with the quality of life of both the patients and their families. Correia (2011) points out that the unpredictability, characteristic of diabetes, generates a sense of discomfort and insecurity in parents when they are not close to their diabetic children. Over the past decades, it has been verified that the incidence of this disease is increasing in children and young people. In 2010, 18 new cases of Type 1 Diabetes were detected per 100,000 young people aged 0-14 years, nearly twice as high as in 2000 (similar to that observed in the 0-19 age group) (Boavida et al. 2012). This reality requires joint efforts on behalf of the health professionals, the child/adolescent and the family, with regard to the adaptation, treatment and metabolic control of this disease in order to minimize the complications that may result in the long term as well as to maintain the quality of life (Almino, Queiroz, & Jorge, 2009). Therefore, the need to involve the family as an integral part of the whole care process of the diabetic child and adolescent is evident (Alencar, & Alencar, 2009). In this sense, it seems relevant to identify the experiences of the parents regarding their child's Diabetes Mellitus. In fact, the family constitutes a system in which the behaviour of each individual is interdependent of the others (Corrêa, Franco, Demário, & Santos, 2012), and when exploring the parents' experiences of this phenomenon, we can obtain subsidies for the improvement of the health care provided by health professionals to the child/adolescent with diabetes as well as to their family (Sousa, 2012).

Methodology

In our clinical practice we have seen an increasing number of children and young people with type 1 diabetes. Inevitably, we have also noticed the difficulties, anxiety, fears and exhaustion of parents in dealing with this situation.

In order to identify the parents' experiences with their child's Diabetes Mellitus, we developed this study based on the following research questions: What are the feelings experienced by parents after the diagnosis of Type 1 Diabetes Mellitus has been made to their child? What experiences struck the parents during the process of acceptance and adaptation to diabetes? To what extent did the intervention of the health professionals influence the adaptation of the child/adolescent and his/her family to diabetes?

We conducted a qualitative, exploratory-descriptive, phenomenological study using the semi-structured interview. The target audience was the parents of children/adolescents with Diabetes Mellitus type 1 who are followed in the Paediatrics External Consultation of a Hospital Centre in the North of Portugal. We used a non-probabilistic sample of 14 parents (10 mothers and 4 fathers). The inclusion criteria were parents of a child or adolescent with Type 1 Diabetes Mellitus, 4 years of age or over, and in whom the diagnosis of the disease had been carried out more than 6 months ago. The study had been authorized by the Hospital Centre and obtained a favourable opinion from the Ethics Committee. The interviews were carried out by the researcher in a private consultation office and, prior to each interview, parents were informed of the objectives, benefits and nature of the research, and the

confidentiality and anonymity of the data was ensured. We obtained a written informed consent from each parent to guarantee eligibility to participate in the study.

A coding grid was drawn up for each interview, with the interview number, time and duration. An audio recorder was used and later the interviews were transcribed into a word document. We performed the content analysis by coding the data (Amado, 2000; Bardin 2009; Streubert, & Carpenter, 2002). That is, the relevant characteristics of the message content were transformed into units so as to allow their description and precise analysis. A careful reading of each interview was carried out, followed by a re-reading in the attempt to eliminate irrelevant information for the study and to better understand the material analysed in order to construct the categories. For each interview a code was assigned (M1 to M10 for mothers and P1 to P4 for fathers).

Findings

Our sample is composed of 14 participants, 10 mothers and 4 fathers. We found that 57.1% are between 31 and 40 years old. All parents are employed and 50% of the mothers, too. The majority of the participants (57.1%) has a level of schooling below secondary level, 28.6% completed the secondary level and 14.3% have a degree in higher education.

Regarding marital status, 78.6% of the participants are married and 21.4% live in a non-marital partnership. Half of the sample has 2 children, 35.8% have 1 child and 7.1% have 3 children and the same percentage has more than 3 children.

To what concerns children/adolescents with diabetes, 8 of them (57.1%) are boys and 6 (42.9%) are girls. The majority is between 6 and 10 years old (57.2%) and only 21.4% are between 11 and 15 years old. In the majority of the children, diabetes was diagnosed before the age of 5 (57.2%).

Regarding the elapsed time since the diagnosis was made, we verified that it had been performed more than 4 years ago in 42.9% of the children, between 2 and 4 years in 21.4% of the children, and between 6 months and 2 years in 35.7% of the children/adolescents.

On the following pages we present the content analysis of the interviews. Taking into account the process inherent in qualitative studies, the categories that are represented in the following tables with their indicators arose.

Impact Of Diabetes On The Family

It was verified that the diagnosis of diabetes ascends within the family, changing its dynamics. The parents' discourse reveals the existence of the impact of diabetes on the family (Table 1), giving rise to the need for a restructuring of the family life. We have verified the existence of seventeen enumeration units in this indicator. The parents report this fact as follows: "(...) *there were some repercussions, we had to change some habits (...)*" (M3), or even more significantly "*I had ... to stop working. P had to be pricked and I had no help (...)*" (M6).

In the implications on the parents' personal life, we witnessed the difficulties experienced and felt because of diabetes, both in terms of accepting it and in the repercussions that it entails. Examples of this are expressions such as "(...) *at first, I did not want to believe it (...)* but then I accepted it, I had no choice (...). *I tried to adapt to hospitals, to insulin (...)*" or even "(...) *sleep, forget it! I do not think I have slept a single night*" (M3).

In addition to the personal implications, the onset of diabetes in the family also affects the social life of the parents. The speech of the parents reflects this constraint especially with regard to their children's school and to them being a part of society when they state, "(...) *I wanted to take my child out of the nursery. I was afraid that they were not prepared to administer insulin and also because of the food (...)*" (M10), and also "*When we are sometimes socializing (...) and he/she wants to eat and we cannot allow it (...) people start to stare (...)*" (P1), or in the expressions "(...) *people are sometimes a bit uneducated in this aspect (...) I feel like using foul language!*" (P2).

Table 1 – Impact of diabetes on the family

Category	Indicators	Recording unit
Impact of diabetes on the family	Restructuring of family life	17
	Implications in personal life	12
	Implications in social life	8

Parents' Feelings/Emotions

The diagnosis of diabetes represents a milestone in the life of parents with a huge negative burden that provoked several feelings in the participants of this study (Table 2). The most expressed feeling by parents was fear/insecurity. "(...) *one is always afraid (...)* always afraid that something will happen (...)" (M3). As a consequence of fear, insecurity also arises "(...) *even when I was told "now you do not need to see it in the middle of the night", I would still see it, that is how it is...*" (M3), or as participant M9 describes it "(...) *not showing my insecurity was very complicated (...)*".

The second feeling most referred to by parents was concern. The fact that the child has diabetes represents, for most parents, an increased responsibility (M1, M5, M6, M7, M8, M9) with a need for control, as M3 states: "*It is always that anxiety about whether or not everything is okay... it is that concern (...)*". P2 and M10 also stress this idea when they say "*I am always more worried, I have to always be on top of him (...)*".

We verified that sadness/anguish is also within the feelings that are the most visible by the participants in the study. Many times this sadness is manifested by crying: "*I got tired of crying in this hospital ... it was complicated!*" (M6, M4, M8, M9). In some of the parents, this feeling lingers and accompanies them on a day-to-day basis, as verbalized by P2 "*It took a toll on me and still does.*"

Revolt/frustration was also reported by the parents. Participant M4 testifies this revolt when she says "*(...) why did it have to happen to our daughter? Why her?*". Also, father P1 stresses this feeling when he says "*(...) I felt destroyed ... and revolted (...)* I was outraged".

Feelings like guilt and denial also emerged in the analysis of the data. Initially, the non-acceptance of that reality "*(...) I did not believe it...*" (M2) and later the feeling of guilt when confronted with the diagnosis of diabetes "*(...) I am almost positive that I did not wash my hands well when I made her soup, or I did something wrong when she was a baby (...)*" (M4). Sometimes blame perpetuates, as expressed by P2 "*We always feel guilty (...)*".

Table 2 – Parents’ Feelings/Emotions

Category	Indicators	Recording unit
Parents’ Feelings/Emotions	Fear/insecurity	12
	Concern	11
	Sadness/anguish	10
	Revolt/Frustration	8
	Guilt	4
	Denial/shock	4
	Disorientation	3

Changes in Family Life

The diagnosis of diabetes forced some changes in the family life of the study participants (Table 3). The change in eating habits was the most mentioned indicator: "*We learned how to eat better, to eat at certain times of the day.*" (M5).

We also found that after the diagnosis had been made, the parents felt the need to monitor and supervise their child more. This fact can be verified through various expressions made by the parents: "*(...) to be more on top of her (...)* the need to have to watch over her" (M1, P2, M8). However, this need is closely related to the concern with the child's clinical situation, as can be seen in the following excerpts: "*(...) stressful day and night (...)* we never let J. sleep alone at night (...)" (M9); "*I always carry my mobile phone (...)* then she calls me (...) to say (...) how she is doing" (M10).

The verbalisation of the participants regarding the limitations of going out is also noticeable. "*We ... basically stopped going out, to restaurants*" (P1, P2); M9 says "*(...) we stopped doing some less important things, like going out, trips to the beach*". This limitation is justified by P3 when stating that "*The disturbance had to do with him going to the house of his grandparents, uncles, because people do not want to be held responsible for such care.*" Some parents also voiced the need for some changes related to diabetes, for instance: "*What changed was having to measure the amounts and give him insulin according to the amount*" (P3), and also "*(...) in the morning, there is always that precaution to get up early (...)* and not enjoy what we are doing (...)"(M10) and M6 points out "*I just had to stop working. P. had to be pricked and I had no help.*"

Table 3 – Changes in Family Life

Category	Indicators	Recording Unit
Changes in Family Life	Change in eating habits	14
	Higher monitoring and supervision of son/daughter	13
	Limitations of going out	8
	Changes related with diabetes	7
	Limitations in shopping	3

Changes in family dietary

We can see in this category (Table 4), that the most mentioned change was related to the type of dietary. The parents stated that they had to reformulate the dietary according to the type of food and quantities, as M2 states "*(...) I removed the sweets but added more vegetables!*" and also M4 "*(...) we are much more careful with what we eat (...)*". Faced with the care inherent in diabetes, meal times also changed. Thus, M10 and P4 convey "*(...) we started having schedules to eat*", and M2 as well "*(...) the schedules to eat changed, because she did not have any schedules (...)* she ate whenever she wanted." We also noticed that some participants stated that they only had to make some adjustments, such as M3 when referring "*(...) we already had everything more or less set, fixed meal times, except for supper (...)* now everybody has supper (...)", or even M6 "*The only thing he changed was that he would not eat at night (...)*".

One of the mothers said "*(...) during meals, we would all eat together and now I have to cook food separately (...)*" (M7), and M8 says that "*(...) I sometimes make two types of soup ... but the rest of the food is the same for everyone.*"

They mentioned some difficulties in eating habits, mainly introducing vegetables in the dietary. One of the mothers (M8) reports that "*He would not eat a bit of cabbage or lettuce.*" Regarding the ingestion of certain food items or sweets by their children, M4 refers "*(...) we sometimes have to be strict. And sometimes she eats without us noticing (...)*".

Table 4 – Changes in Family Dietary

Category	Indicators	Recording Unit
Changes in Family Dietary	Type of dietary	12
	Meal Times	11
	Family dietary	9
	Difficulties felt by parents	9

Parenting children with diabetes

Some indicators that reflect the readjustment of family life emerged (Table 5). In this context, the development of parental competences has become crucial to allow the readjustment of the parental role. The parents' commitment to acquiring these new skills is noticeable throughout the speeches, especially when M7 and M9 refer, "*(...) I did not understand, nor did I know what it was, diabetes (...)* after that I got used to it (...)". Still, M9 adds "*I have read absolutely everything on it (...)* I try to do everything that is within my reach." Also, P2 says that "*(...) the first time I administered it, (referring to insulin) I had to bend down because I thought I would not be able to get back up*" P2.

Another one of the indicators refers to the difficulties in accepting diabetes. These are related to the parents' emotions as shown by P1 "*... there comes sadness from the bottom of the chest ... but it stays inside ... we try not to demonstrate it (...)*", or M2 that says: "*It was a bit hard (...)* because I was just a child (...)". In some cases this difficulty may be associated with parental perception as expressed by M10. "*As much as they say that she can live a normal life, she has to live a different life from everyone else,*" and P2 says "*He is more limited, he cannot play as much as he used to (...)*".

Some positive aspects of the acceptance of diabetes, such as the fact that the child or adolescent has accepted his/her clinical condition, were perceived "*(...) he had enough strength for himself and for me*" (P2). Another mother says "*(...) but only because she reacted very well, she was not a girl who cried because she had to be pricked (...)* I think we all adjusted well (...)" (M3).

Some difficulties in the relationship are essentially related to the behaviour of the children, as we can see from the following excerpts: "*(...) we are still going through a phase ... everything is out of control ... we do not live well ... but we are living (...)*" (P1). Also, M2 refers "*(...) she will cry alone and not tell anyone anything (...)*".

Table 5 – Parenting children with diabetes

Category	Indicators	Recording Unit
Parenting children with diabetes	Development of parental competences	19
	Difficulty in accepting diabetes	6
	Favourable aspects for binding and accepting diabetes	7
	Difficulties in binding	5

Experiences with other children

In this category, the participants of the study mentioned behaviours and feelings related to the experiences of their children with other children (Table 6). We find that jealousy is felt among siblings of children or adolescents with diabetes, as P4 says. *"He was sometimes jealous, that I would pay more attention to her (...)"*.

On the other hand, some parents highlight the understanding and mutual help between siblings. M5 states that *"His brother very understands (...) if he wants something, he is careful enough so that the other does not see it."* M8 stresses this feeling by saying *"Her sister is very responsible (...) she helps out."*

However, some parents have expressed some difficulties in dealing with this situation given its peculiar characteristics. P4 says *"(...) it may not seem like it, but they are two children and sometimes I think that we are giving more affection to his sister than to him ... but we are not ..."* P2 reinforces this difficulty by referring *"One can and the other cannot; I think it's unfair (...) sometimes we try to avoid going out with them together just to avoid requests ..."*.

Table 6 – Experiences with other children

Category	Indicators	Recording Unit
Experiences with other children	Jealousy	5
	Understanding and mutual help	4
	Difficulties felt by parents	5

Fears experienced by parents

After the diagnosis of diabetes, the participants expressed some fears and anxieties regarding the future of their child (Table 7), namely fear of other pathologies appearing *"(...) there is always that fear that something else will happen with her health (...)"* (M4). Hypoglycaemia is also a cause for concern, and M5 points out *"(...) I am afraid because of his hypoglycaemia ..."*

Adolescence represents an important milestone in life, full of challenges, where autonomy is increasing and personality is created. Hence, this symbolizes one of the parents' yearnings about the future, as seen in the following excerpts: *"(...) when she goes to university, when she starts to go out at night and we can no longer say "do not eat that", "do not drink that", "do not do that", (...)"* (M4).

Vascular complications are a concern for some parents as witnessed in the expression: *"(...) losing a leg, (changes) of the eye sight (...) not being able to lead a normal life"* (M8).

Table 7 – Fears experienced by parents

Category	Indicators	Recording Unit
Fears experienced by parents	Diagnosis of other pathologies	5
	Hypoglycaemia	4
	Adolescence	4
	Vascular Complications	2
	Fear of making mistakes	1

Opinion on the health professionals and supports received

All of the parents expressed satisfaction considering the care of excellence provided. *"It's an excellent team (...). For both her and me, it helped a lot (...)"*(M2). Other parents also expressed their satisfaction: *"It was very good (...) our needs were fulfilled"* (P1, M9, P4).

Essentially, the study participants felt the support of the health professionals. Some examples of this are the expressions of M6 and M8 *"(...) the nurses, the doctor, in general"* and M9 *"(...) I liked it very much (...) and here in the consultation, we receive a lot of support "*. In addition to this support, the parents also mentioned the support of their child with diabetes *"(...) he had enough strength for himself and for me..."* (P2), and the support of other relatives as M5 states *"From my sister-in-law, from my other child (...) my sister-in-law (...) stays with him (...) if she didn't take care of him, I don't know how I would manage..."*.

Table 8 – Opinion on the health professionals and supports received

Category	Indicators	Recording Unit
Opinion on the health professionals	Satisfaction	14
	Support from health professionals	13
Supports received	Support of the child with diabetes	2
	Support from other family members	2
	Other supports	2

Discussion

The participants reported the difficulties felt when diabetes was diagnosed, as well as the need to restructure their family life, to establish new parental roles, and to take on the implications inherent in both their personal and social life.

Uncomfortable feelings such as a sadness, anguish, revolt, guilt and essentially fear, are present in the speeches of the participants in this study. The studies of Martins, Ataíde, Silva, & Frota (2013) also make it possible to perceive the suffering of the parents before their child's diabetes and the feeling of impotence before this diagnosis. Pilger, & Abreu (2007), point out that these feelings can be understood as a process through which parents face their child's illness and try to find a solution and to adapt to this new reality. At this stage, the role of the multidisciplinary team with the child or adolescent and their family is of the utmost importance, with the aim of providing them with the care needed to help them in this moment of change. In the study, the need that parents feel to supervise their child with diabetes is visible. This situation brings suffering and they feel a need for a greater dedication and vigilance. Some parents had to leave their professional activity in order to be entirely available to care of their child since they had no other support. This need was also verified in other studies. Leal, Fialho, Dias, Nascimento, & Arruda (2012) report that the difficulties experienced can comprise several dimensions and that the treatment of the disease requires special care and attention on behalf of the family.

Another change verbalised concerns social life. As in the study by Corrêa et al. (2012), when faced with diabetes, parents experience their social life with some limitations. At times, they stop going to places or participating in events and festivities, so that the child is not in contact with food that he/she should not consume. Martins et al. (2013) stress that even after adapting to the disease, families continue to avoid going out to social gatherings, which can lead to the family's social isolation.

The change in eating habits is perceived by the study participants as one of the main alterations, both with regard to the type of dietary as well as the need to establish meal times. Its restructuring implies changes that, in most cases, extend to the whole family. We also found that many parents see these changes as beneficial to the family's health, as food becomes healthier and there are meal times to follow.

With regard to the development of parental competencies, parents feel compromised in their parental role when faced with the difficulties inherent in diabetes. These adversities require developing skills and competences to become capable and to feel confident in caring for the child. The role of health professionals with the family is fundamental so as to contribute positively to the definition of the new parental roles, which is corroborated by Corrêa et al. (2012) and Martins et al. (2013).

We see an ambivalence of feelings in the relationship with other children. Parents perceive feelings of jealousy on behalf of the siblings, but also report understanding and mutual help. Sometimes they find it difficult to make decisions in relation to a healthy child and another child with a disease that implies certain limitations, mainly at the dietary level.

The analysis of the interviews shows the parents' yearning regarding the consequences and the risks of diabetes. The concomitant appearance of other pathologies and hypoglycaemia are the parents' most feared complications. We verified unanimity in parents' satisfaction with the care provided by health professionals. They mentioned the favourable contribution of the multidisciplinary team, especially the nursing team, in acquiring knowledge and skills on how to deal with diabetes. The interviewees said they felt the support, essentially from the health professionals, but did not rule out the pertinent support they felt from other family members, too.

Conclusions

The diagnosis of diabetes has repercussions in families with an enormous impact at a behavioural, personal and social level. The family faces a new reality and experience, new feelings and concerns, and the involvement of all its family members is necessary for the reorganization of the family dynamics.

Bearing in mind the starting points, we carried out a qualitative research in 10 mothers and 4 fathers to identify the feelings experienced with their children diagnosed with Type 1 Diabetes Mellitus, and to understand the most challenging experiences in the process of acceptance/adaptation in the caring for the child with diabetes.

Given the complexity of diabetes, parents' anguish, fear, and disorientation are understood after the diagnosis and throughout the process of acceptance and control of diabetes. In this sense, we sought to understand the extent to which the intervention of health professionals in the adaptation of the child and the family in this process of transition to diabetes was important.

From the feelings mentioned above, parents feel the need for greater vigilance and supervision of their children by dedicating much more attention and time to them. Given the characteristics of diabetes, the family needs to change eating habits, essentially with regard to the type of food and the meal times. Some of the respondents avoid participating in festivities or events so that the child does not have to be in contact with food that they cannot eat. When there are other children involved, parents face a daily challenge regarding decision-making in relation to a healthy child and another one with diabetes.

Some parents feel their parental role is compromised and seek to develop skills and abilities to become capable and confident to care for their child. Some parents feel disoriented, sad and sometimes guilty. Thus, they become very vulnerable, so the support provided to them is extremely important for parents to gain strength and to be able to care for their child.

All the interviewees mentioned the support of the health professionals as a valuable aid in the acceptance of diabetes, in the acquisition of skills and competences, and in the redefinition of the parental role.

With this study, we are better able to understand the experiences of the parents in relation to the child/adolescent with diabetes. In light of this data, health professionals will better understand the difficulties experienced by parents and thus foster good practices and improve the quality of life of the child and his/her family.

References

- Alencar, D., & Alencar, A. (2009). O papel da família na adaptação do adolescente diabético. *Revista da Rede de Enfermagem do Nordeste*, 10(1), 19-28.
- Almino, M., Queiroz, M., & Jorge, M. (2009). Diabetes Mellitus na adolescência: Experiências e sentimentos dos adolescentes e das mães com a doença. *Revista da Escola de Enfermagem da USP*, 43(4), 760-767.
- Amado, J. (2000). A técnica de análise de conteúdo. *Revista Referência*, 5, 53-63.
- Bardin, L. (2009). *Análise de conteúdo*. Lisboa: Edições 70.
- Boavida, J., Fragoso de Almeida, J., Massano Cardoso, S., Sequeira Duarte, J., Duarte, R., Ferreira, H.,... Raposo, J. (2012). *Diabetes: Factos e Números 2011 – Relatório Anual do Observatório Nacional da Diabetes*. Lisboa: Sociedade Portuguesa de Diabetologia.
- Corrêa, A., Franco, S., Demário, R., & Santos, E. (2012). Diabetes Mellitus na infância e adolescência: Vivência dos pais em relação à alimentação do seu filho. *Alim. Nutr.*, 23(4), 631-637.
- Correia, A. (2011). *Stress parental, perturbação emocional e estratégias de confronto em mães de crianças com fibrose quística e com diabetes (Dissertação de Mestrado, Universidade de Lisboa)*. Lisboa, Portugal. Acedido em <http://repositorio.ul.pt/handle/10451/4855>
- Gregory, J., Moore, D., & Simmons, J. (2013). Type 1 Diabetes Mellitus. *Pediatrics in Review*, 34, 203-215.
- Leal, D., Fialho, F., Dias, I., Nascimento, L., & Arruda, W. (2012). A vivência dos familiares de crianças e adolescentes portadores de diabetes mellitus tipo 1. *Revista Eletrónica de Enfermagem*, 14(1), 189-196.
- Martins, E., Ataíde, M., Silva, D., & Frota, M. (2013). Vivência de mães no cuidado à criança diabética tipo 1. *Revrene*, 14(1), 42-49.
- Pilger, C., & Abreu, I. (2007). Diabetes Mellitus na infância: Repercussões no cotidiano da criança e da sua família. *Cogitare Enfermagem*, 12(4), 494-501.
- Sousa, P. (2012). *O exercício parental durante a hospitalização do filho: intencionalidades terapêuticas de enfermagem face à parceria de cuidados (Tese de Doutoramento em Enfermagem, Universidade Católica Portuguesa)*. Porto, Portugal. Acedido em <http://repositorio.ucp.pt/handle/10400.14/13972>
- Streubert, H., & Carpenter, D. (2002). *Investigação qualitativa em enfermagem: Avançando o Imperativo Humanista (2ª ed.)*. Loures: Lusociência.

Peer Bullying in Schools: Qualitative and Quantitative Study

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Abstract

This study was conducted in order to understand how peer bullying is handled by students and teachers, what can be done to prevent it, and how often students are exposed to it. The study area consists of 10 teachers and 366 students in the Hendek District of Sakarya. The research was a mixed study, the quantitative part was carried out by the adolescent students and the qualitative part by the teachers. In the qualitative part of the study, five questions were asked to teachers in order to identify teachers' views on peer bullying, what measures they took to prevent them, and how they responded to it. The research is based on semi-structured technique. Interview was first recorded by voice recording device, then converted into a written document and analyzed by means of descriptive analysis. In the second part of the study, scale adaptation was made. A total of 366 adolescents' views were reached about peer bullying. In the evaluation of quantitative findings, package programs were used. As a result of interviews with the teachers, the majority of the teachers who witnessed peer bullying responded that the first sensation was to try to understand the student, and the reasons were academic achievement, physical superiority or inferiority, family life and etc...factors were mentioned as the reasons for the students to push this behavior. Many of the teachers reported that in the face of peer bullying, it would be useful to first talk with the student, guide them to the guidance service, and be in collaboration with the family.

Abstract: *Peer Bullying, Qualitative, Quantitative Study.*

Introduction

Peer bullying is becoming an important problem that many people live, witness or individual cause in nowadays. Peer bullying is mentioned as a type of aggression in studies. Aggression means harmful and dangerous behavior in word definition. (Baron R.A., 1977). There is no universally accepted definition of bullying. Some researchers have seen bullying as 'harm' or 'desire to press someone' (Tattum, 1993). However, researchers admit that bullying involves negative or hurtful behaviors (Olweus, 1993). Most researchers add that, unlike wider definitions of aggression or violence, bullying must also include the concept of power imbalance, in which a less powerful person or group is repeatedly and unjustly attacked. (Rigby, 2002; Ross, 2002). This can be summarized as "systematic abuse of power" (Smith ve Sharp, 1994). Roland has described bullying as "the physical or mental suppression of a person who is strong enough to protect himself or herself, periodically and systematically, by a group that is more effective than itself".

Bullying among children is a major public health problem around the world. Bullying is most commonly defined as a repetitive, intentional aggression that is met by a stronger individual or group with a less powerful victim. It is known that exposure to the bullying is associated with a wide range of mental health problems. Victims are generally more anxious and insecure than other students. Some meta-analysis results show that victimization is linked to problems related to internalization. (Shetgiri, 2013)

Rigby (1999) reported that peer violence is caused by a power imbalance. 'Power imbalance can be in different forms. For example, imbalance may be related to differences in physical strength, verbal dominance of another person, or exclusion from groups. It should also be remembered that the bullying often points to repetitive aggression, or at least to anticipation of repetition of aggression. According to Shetgiri (2014), bullying often occurs in areas far from adult supervision, such as playgrounds and school corridors. Verbal and relational bullying can be more difficult to identify than physical bullying. Relational bullying may be more common among girls and lead to feelings of rejection at a critical time in social development. Compared to students who are bullied in school or out of school, whether they are victims or bullies, are not victims or are exposed to bullying; depression is at a significantly higher risk for serious suicidal thoughts (SSI) and suicide attempts. More frequent bullying behavior (as a victim or bully) increases the likelihood of the student becoming involved in depression or attempting suicide. (Smith, 2011)

Method

Semi-structured interviews with qualitative research methods was used in this research that is (Yıldırım and Şimşek, 2008) defined as "a qualitative research process in which qualitative data gathering methods such as observation, interview, document analysis are used and a qualitative process for revealing perceptions and events in a natural and realistic manner" In the study, the interview form, which was developed in order to determine the opinions of teachers about their experiences about peer bullying, was given the final form in the direction of expert opinions. There are five open-ended questions in the interview form.

Teachers' ideas about peer bullying, problems they faced, and suggestions for solutions were tried to be determined. In the quantitative part, which is the second stage of the research, a scale adaptation study was carried out. In this context, the validity and reliability studies of the "Peer Bullying Scale" developed by (Roberson and Renshaw, 2017) were conducted on the Turkish sample group. The Turkish version of the scale was administered to 366 Turkish adolescents and examined by reliability analysis and confirmatory factor analysis. The compliance indices obtained from confirmatory factor analysis of the scale ($\chi^2 = 223.97$, $sd = 44$, $p = 0.00$, $RMSEA = 0.10$, $NFI = .94$, $NNFI = .94$, $CFI = .95$, $IFI = .95$ and $RFI = .93$, $AGFI = .85$, $GFI = .90$, and $SRMR = .55$) suggest that the one-dimensional model is well suited. Reliability coefficient of the scale was 0.87. The scale consists of 11 items and 1 sub-dimension.

Participants

In the study, the study group was identified by an easily accessible sampling method. In the easily accessible sampling method, "the researcher determines the working area in the environment that is close to him/her in terms of economical and rapid results of the study" (Yıldırım and Şimşek, 2008). With the sampling method that is easily accessible in the research, 10 teachers working in Noksel Elementary School in Sakarya constitute the study group of the research. . There were 9 female and 1 male in the group of the teachers. The average age of teachers is 32.2 and the average age of seniority is 8.4.

Frequency and percentage distributions of the demographic information of teachers participating in the survey are presented in Table 1.

Table 1. Demographic characteristics of interviewed teachers

INTERVIEWERS	AGE	SENIORITY YEAR
Teacher 1	34	11
Teacher 2	25	3
Teacher 3	33	10
Teacher 4	26	3
Teacher 5	39	17
Teacher 6	40	18
Teacher 7	30	8
Teacher 8	27	4
Teacher 9	30	8
Teacher 10	38	2

As seen in Table 1, the average age of teachers participating in the interviews is 32.2 and the average age of seniority of the teachers is 8.4. When the ages of the participants were examined, it was determined that they were between 25 and 40 years of age. When participants' seniority years of employment were examined, it was determined that they were between 2 and 18 years.

Data Collection Tool

In the research, interview form was used as data collection tool. In the preparation phase of the interview questions, the literature was examined and 5 related open-ended questions were prepared and written in the interview form. Open-ended research questions "provide the researcher with a flexible and open-ended approach to the subject they wish to study" (Yıldırım and Şimşek, 2008).

Interviews were held with the teachers in Hendek, who made face-to-face interviews. Interviews were recorded by voice recording device in order to avoid loss of data and then transferred to the article. Verbal permission has been obtained from the teachers on voice recording. During the interview, the teachers responded to the five questions asked to them in response to the experiences they experienced and conveyed their thoughts.

Data Analysis

The data obtained from the interviews were analyzed by descriptive analysis method. Descriptive analysis; (Yıldırım ve Şimşek, 2008), which is composed of four stages: defining a framework for descriptive analysis, processing of data according to thematic framework, identification of findings and interpretation of findings. The thematic framework was defined by researchers for the analysis of data. In this context, the data are first coded separately by each investigator. Later co-codings were made on common themes with the view-union by comparing the data collected.

The written texts resulting from the interviews were reviewed repeatedly, the appropriate data for the purpose of the study was coded, and the themes describing at the general level the encoded data were determined. The findings were arranged in tables. The interviewed teachers were coded from T1 to T10. In the interpretation of the findings, a direct citation was given from the teachers' views.

Findings And Results

This section contains the findings of the research. Teacher views on peer bullying are shown below in tabular form. Table 2 shows the way in which teachers use their means to prevent peer violence.

Table 2. Teachers' views on preventing peer bullying

Theme (Categories)	Codes	n	%
Routes to prevent the bullying	Talking to students (T1,T2,T3,T4,T5,T6,T7,T8,T9,T10)	10	100
	Directing Consultation service (T1,T2,T3,T4,T5,T6,T7,T8,T9,T10)	10	100
	Parent cooperation (T1,T2,T3,T4,T6,T7,T8,T9,T10)	9	90

When Table 2 is examined, 100% of the teachers stated that they can avoid these problems with the help of the guidance service, 100% of the teachers, by talking to the student to prevent peer bullying. 90% of teachers reported that they should cooperate with the parent and that this problem could be prevented. A list of individual statements from the teachers' views were given below.

"The first step to prevent a peer bullying is to listen to the child well and get to the root of the problem. If the reasons that push the child to bullying are well-defined, the solution will be so well-defined. In such cases, it directs the child to socialize in more positive environments, keeping away from any situation that would exacerbate the violence. " (T4)

"I would try to understand the emotion that caused the student to speak face-to-face with the student who was doing the bully. I tried to deter him from exhibiting such behavior by telling him that his behavior harmed him and the other person. " (T2)

"I am trying to create a good friendship environment in the classrooms where I am a class counselor. I pay particular attention to the fact that children are not excluded from games. I will intervene instantly as soon as I see the bullying. I try to prevent this issue by reporting to the class teacher first. " (T10)

teachers' views on why bullied people make bullying are presented in Table 3.

Table 3. teachers' views on why bullied people make bullying

Theme (Categories)	Codes	n	%
Reasons for bullying	Physical superiority / defect (T1, T2, T3, T4, T7, T8, T9, T10)	8	80
	Academic success (T1, T2, T3, T4, T5, T7, T10)	7	70
	Family experience (T2, T3, T4, T5, T6, T9, T10)	7	70
	Financial status (T1, T4)	2	20

When Table 3 is examined, 80% of teachers reported that physical reason or physical defect was among the causes of the bullying. And 70% of the teachers stated that academic success is among the reasons for the toughness. Another 70% of the teachers said that this could be the cause of family life, while 20% reported that it was the financial situation. A list of individual statements from the teachers' views are given below.

"Especially the envy of the successful students and the bullying done to the successful person in this direction is the reason I encountered the most. Another reason is that the other person is weaker or smaller than the other person. Particularly stuttering, eyeglass wearers or students with similar physical disadvantages are unfortunately victims of bullying (T10).

"Students often bullied with weak or silent characters. Children who experience violence in the family or those who experience negative consequences of divorce tend to be more inclined. People who are successful in their lessons, or those who have many failures, are another reason to be bullied or exposed. "(T7)

"Domestic violence, violent TV programs, and emotional situations within it can push children into this situation. Especially, they try to solve the problems of children who have lost their self-confidence by bullying. The financial situation is another dimension." (T4)

"I think amongst the students' bullying reasons is the first feeling of jealousy. Successful students are often exposed to bullying because they are jealous. Children can often be classified as mental and emotional differences, which usually exclude what is different from them." (T5)

The opinions of the teachers on what measures can be taken to prevent bullying are presented in table 4.

Table 4. Teachers' views on bullying prevention

Theme (Categories)	Codes	n	%
Suggestions for avoiding bullying	Guidance service (T1, T2, T3, T4, T5, T6, T7, T8, T8,T9,T10)	10	100
	Family cooperation (T1, T2, T3, T4, T5, T6, T7, T8, T8,T9,T10)	10	100
	Instilling sense of security (T5, T10)	2	20

When Table 4 is examined, the results of the teachers' opinions on the issue of bullying prevention are pointed out to be directed to the guidance service and the necessity of parental cooperation with a serious rate of 100%. 20% of the teachers stated that students who are exposed to bullying should be instilled with self-confidence in order to make them feel better. The teachers' views are given below.

"I try to talk to the students directly and get in contact to the related departments to prevent the problem. If necessary, I will contact the parent and try to control the child in every area." (T2)

"The emotional and behavioral problems should be addressed, the family and the teachers should be cooperated, the child should be informed about the possible consequences of doing so and necessary guidance should be given to the students in need." (T3)

"I would like to discuss the problem with the classroom guidance teacher and school guide teacher and take steps in cooperation with the family. I try to make students feel that friendship can be established with those who are instilled with confidence and are bullied." (T10)

"This process must be quite long lasting. The necessary guidance work should be done in cooperation with the family. First of all, we should adopt what are the important virtues of love, compassion, understanding and interest in the home environment." (T9)

The opinions of the teachers about the sanctions imposed by the school administration against bullying are presented in table 5.

Table 5. Teachers' views on school administration sanctions against bullying

Theme (Categories)	Codes	n	%
School administrations' sanctions	Family cooperation (T1, T2, T4, T5, T6, T7)	6	60
	Directing consulting service (T1,T3,T4, T6,T9,T10)	6	60
	Warning (T5,T7,T10)	3	30
	Assigning tasks (T3, T7, T10)	3	30
	Punishments (T7, T10)	2	20

When Table 5 is examined, it is seen that the attitude of the school administration against peer bullying is with the rate of 60%, directed to guidance service and contact with parent. 30% of the teachers reported that administrators were alerted and tried to persuade their students, but 30% of the teachers stated that they were trying to reduce this

feeling of violence by giving certain tasks to the students. 20% of the teachers reported that some punishments were given by the administrations as the last stage. Quotations from the teachers' discourses are given below.

“Our school directs these kinds of students to the guidance service and informs the parents and tries to find solutions.” (T4)

“Our school management is constructive towards peer bullying. It is desirable for pupils to come to an agreement among themselves, guided by their teachers. Punishment or similar sanctions are always on the second stage.” (T9)

“School management announces to the upper classes that they are the pioneers of the lower classes in particular. He also explains that the upper classes are their brothers and sisters and that they need to protect them. He takes necessary precautions by assigning students against the bullying.” (T10)

“Students are warned at regular intervals and recommendations are made for students not to exhibit such behavior..” (T8)

The opinions of teachers about how they react when they see someone who is bullied are presented in table 6.

Table 6. Opinions of teachers when they see someone who is suffering from bullying

Theme (Categories)	Codes	n	%
What they fell when they witness bullying	Empathy (T1,T2,T3,T4,T5,T6,T7,T8,T9)	9	90
	Trying to help (T1,T2,T3,T4,T6,T7,T8,T9)	8	80
	Pretend not to see (T5, T10)	2	20

When Table 6 is examined, 90% of the teachers have indicated that they are trying to understand and empathize the student who is exposed to the bully. 80% of them stated that they tried to help them 50% of the teachers said they were trying to ignore the fact that the student is not a student. Quotations from the teachers' discourses are given below.

“I have long talked about establishing empathy to understand, to be with you, and how to solve this problem together.”(T9)

“I have observed that being overprotective, especially during adolescence, is disgraceful for the person who is bullied. It has been seen that the state tried to block emerged another bullying situation, such as mocking. For this reason, I try to wake up the notion that the child who is often in the process of being abused is not informed.”(T10)

“ I try to empathize with this kind of person and tell him that the situation can be overcome in terms of him. I gave examples of life and information on what should be done in such situations. ” (T4)

“I said that this situation that the student is experiencing can be experienced by others and I will give him the support that needs to be overcome. (T2)

Quantitative Findings

Participants

The scale study was performed on 366 adolescents. 174 (47%) female and 192 (53%) male students were included in the study. Students in the sample; 80 (21%) students are in the sixth grade, 174 (47%) are in the seventh grade and 112 (32%) students are in the eighth grade. The average age of the sample is 12.3. Bullying Scale (Based on the 2009-2010 report on health behaviors in school children) The bullying relationship among young people has consistently led to serious consequences for both the victims and the bullies. Empirically verified assessment tools are needed for the participation and characterization of adolescents to be used in research and practice.

Bullying Scale (Roberson and Renshaw, 2017), consisting of 11 items and a sub-dimension, is based on Likert with a rating of 5. The scores obtained from this scale are important for the adolescents to reveal the tendency to bully behavior. Scales include social exclusion, physical aggression, spread of lies, various forms of abuse and various types of cyber bullying. Factor loadings of the scale range from .77 to .95. The fit index of the scale $\chi^2(208) = 3174.054, p < .001; CFI = .971; RMSEA = .053 (90\% CI = [.052, .055]); SRMR = .064$. Reliability of the original scale. 99.

Results

Item Analysis and Reliability

As a result of the analysis to determine the item separability of the scale, the corrected correlation coefficients were found to vary between .45 and .67. Table 1 shows the results of the analysis.

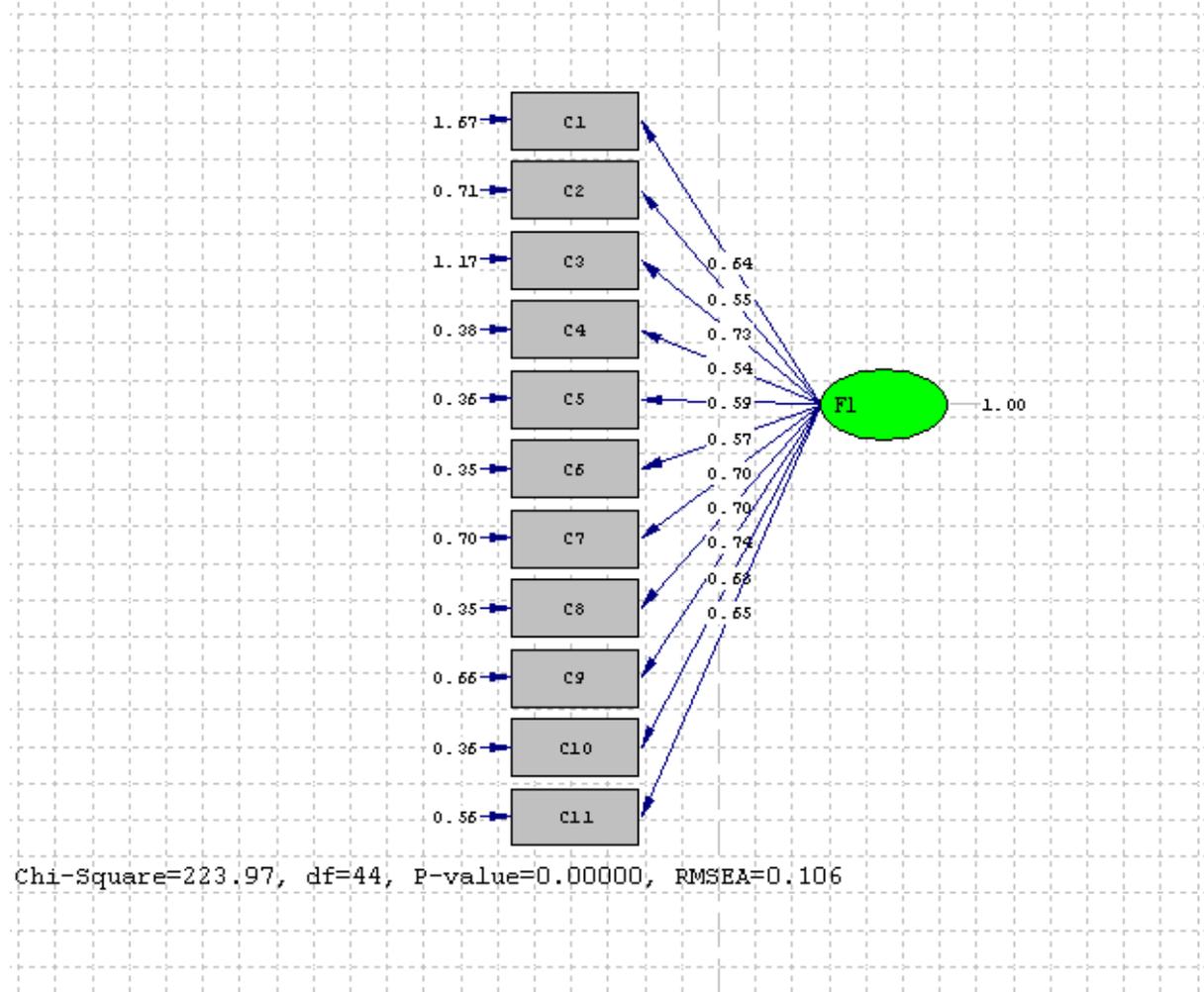
Table 1. Correlation Scores of Peer Bullying Scale Items

Item number	<i>r_{ix}</i>	Item number	<i>r_{ix}</i>
1	.45	7	.61
2	.52	8	.68
3	.56	9	.61
4	.61	10	.67
5	.65	11	.59
6	.63		

For all of the scale, Cronbach's (α) coefficient was found as .87.

Structure Validation

The compliance indices obtained from confirmatory factor analysis of the scale ($\chi^2 = 223.97$, $sd = 44$, $p = 0.00$, $RMSEA = 0.10$, $NFI = .94$, $NNFI = .94$, $CFI = .95$, $IFI = .95$ and $RFI = .93$, $AGFI = .85$, $GFI = .90$, and $SRMR = .55$) suggest that the one-dimensional model is well suited. Standardized regression weights of confirmatory factor analysis are given in figure 1:



Conclusion, Discussion And Recommendations

As a result of the qualitative study, 100% of the teachers stated that they can avoid these problems with the help of the guidance service and talking to the student about preventing peer bullying. 90% of teachers reported that they should cooperate with the parent and that this problem could be prevented. In the study of Holt (2009) on the prevention of bullying, it was reported that the family environment had an effect on the students and that family cooperation was essential for solving these problems. Roberts, (1996), Olweus (1993) found that individuals who had been subjected to bullying in their work were also subjected to pressures in their families, withdrawn to the corners, they are the result of pushing these attitudes, which is why these children are exposed to this behaviour. Parents should be provided with parental education.

80% of the teachers reported that physical reason or physical disability was among the causes of the bullying. And 70% of teachers stated that academic success is among the reasons for the bullying. Glew GM and others (2005) concluded that students' exposure to bullying in school was the first reason for their poor academic achievement. Schwartz (2003) reported that, when academic achievement fell, the risk of being bullied at school increased. In his study, Smokowski, P. R., & Kopasz, K. H. (2005) stated that bullies are more physically superior to the people they bullied, and more active and social in their personality traits. Another 70% of teachers said that this could be the cause of family life, while 20% of teachers reported that the financial situation of the student was also influenced. (Özkan, Çifçi, 2010) have reported that the academic achievement and the financial condition of the student are among the reasons of peer violence in their studies. Similar results have also been reported by Çuhadaroğlu et al. (2004), indicating that the income level of the family and, consequently, the decline in educational levels have an effect on children's exposure to bullying. Shetgiri, R. (2013) has achieved results that will support these findings in his work. However, some teachers have expressed the opinion that students who are exposed to bullying should be instilled with self-confidence in order to make them feel better. Olweus (1993) 'The prevention of peer-bullying behaviors in schools is taught by the school guidance service, through a team of all staff (administrators, teachers, psychological counselors and services) in the school, including parents and students, a preventive program should be developed and implemented. In his work Gökler (2009), he reported that the attitude of the school administration towards peer bullying was directed to the guidance service and passed to the parent. Even though the administrators reported that they were trying to persuade their students by warning them, they also stated that they were trying to reduce the feeling of violence by giving certain tasks to the students. Some of the teachers reported that they resorted to punishment when they were desperate. It is indicated in the work done by Gökler (2009) that such punishments should not be implemented with the thought that they could trigger the bully or cause more harm on the victim.

According to other findings of the study, 90% of the teachers stated that they tried to understand the student who was exposed to the bully and empathize. Kallestad and Olweus (2003) describe their ability to empathize as a key factor how teachers characterize and respond to bullying behaviors.

As a result of the study, teachers see the way of talking to students in the case of peer bullying as a method and give guidance to the guidance service in fact show that teachers do not know exactly how to deal with bullying. This result is also striking in other researches. Research has reached the conclusion that neither experienced teachers nor prospective teachers know how to deal with bullying (Bauman and Del Rio, 2006; Yoon and Kerber, 2003). In addition, it has been shown that in the study, teachers need information about how to intervene with physical and verbal bullying, such as naming and physical disagreements (Bauman and Del Rio, 2006).

Limitations of work and suggestions; the qualitative step of the study may examine the opinions of 10 teachers in the province of Hendek in Sakarya, which may result in narrow scope of results. It is suggested that the sample of the study should be wider, and that more teachers and even parents should be consulted in cooperation. Regulation of in-service training programs on peer bullying for teachers may provide positive contributions to school practices. Relational studies on bullying show that school climate is effective. For this reason, the establishment of intervention studies for the entire school can be useful in preventing peer violence. It can be said that the educational activities to be done to the parents will be beneficial both in the appearance of tyrannical behavior and in the prevention of victimization.

References

- Baron R.A. (1977) The Prevention and Control of Human Aggression. In: Human Aggression. Perspectives in Social Psychology (A Series of Texts and Monographs). Springer, Boston, MA
- Baseg, Valerie E (1989) Bullies and Victims in Schools. A Guide to Understanding and Management. Open University Press, Buckingham, England.
- Bauman, S., & Del Rio, A. (2006). Preservice teachers' responses to bullying scenarios: Comparing physical, verbal, and relational bullying. *Journal of Educational Psychology*, 98(1), 219-231. <http://dx.doi.org/10.1037/0022-0663.98.1.219>.
- Çuhadaroğlu Çetin F., Canat S., Kılıç E., Şenol S., Rugana N., Öncü B., Gündüz Hoşgör A., Işıklı S., Avcı A., 2004. TUBA, Adolescent and psychic Problems: Study of state determine, Turkey, Science Academy Reports. Sayı: 4. Ankara: TÜBİTAK Pres.

- Glew GM, Fan M, Katon W, Rivara FP, Kernic MA. Bullying, Psychosocial Adjustment, and Academic Performance in Elementary School. *Arch Pediatr Adolesc Med.* 2005;159(11):1026–1031. doi:10.1001/archpedi.159.11.1026
- Gökler, R. (2009). Peer bullying in schools. *Journal of Human Sciences*, 6(2), 511-537. Retrieved from <https://j-humansciences.com/ojs/index.php/IJHS/article/view/565/436>.
- Kallestad, J.H. & Olweus, D.A. (2003). Predicting Teachers' and Schools' Implementation of the Olweus Bullying Prevention Program: A Multilevel Study. *Prevention & Treatment* 6(1):No Pagination Specified Article 21 DOI: 10.1037/1522-3736.6.1.621a.
- Olweus. (1987). Bully/victim problems among school-children in Scandinavia. In J. P. Mvklebust, and R. Ommundsen (Eds). *Psykologprolesjonen mot ar 2000*. Oslo: Universitetsforlaget.
- Rigby, K. (1997). Reflections on Tom Brown's Schooldays and the problem of bullying today. *Australian Journal of Social Science*, 4, 85–96. (2002). New perspectives on bullying. London: Jessica Kingsley. (2003). *Stop the bullying: A handbook for schools*. Melbourne: Australian Council for Educational Research.
- Roberts, W. B. & Coursol, D. (1996). Strategies for intervention with childhood and adolescent victims of bullying, teasing and intimidation in school setting. *Elementary School Guidance and Counseling*, 30, 204-212.
- Roberson, A.J. & Renshaw, T.L. (2017). Structural Validity of the HBSC Bullying Measure: Self-Report Rating Scales of Youth Victimization and Perpetration Behavior. *Journal of Psychoeducational Assessment*, 1–16.
- Roland, E. (in prep.). *Familia and school determinants on bullying in school*. Contact: Stavanger College of Education
- Ross, D. M. (1996, 2nd edn. 2002). *Childhood bullying and teasing: what school personnel, other professionals and parents can do*. Alexandria, NA: American Counselling Association.
- Schwartz DG Gorman A Community violence exposure and children's academic functioning. *J Educ Psychol* 2003;95:163- 173
- Shetgiri, R. (2013). Bullying and Victimization Among Children. *Advances in Pediatrics*, 60(1), 33–51. <http://doi.org/10.1016/j.yapd.2013.04.004>
- Smith, P. K. (2011). Why interventions to reduce bullying and violence in schools may (or may not) succeed: Comments on this Special Section. *International journal of behavioral development*, 35(5), 419-423.
- Smith, P. K. and Sharp, S. (eds.) (1994). *School bullying: Insights and perspectives*. London: Routledge
- Smith, Peter. (2011). Why interventions to reduce bullying and violence in schools may (or may not) succeed: Comments on this Special Section. *International Journal of Behavioral Development - INT J BEHAV DEV.* 35. 419-423. 10.1177/0165025411407459
- Tattum, D. P. (1993). What is bullying? In D. Tattum (ed.), *Understanding and managing bullying*. London: Heinemann
- Undheim, A. M., & Sund, A. M. (2010). Prevalence of bullying and aggressive behavior and their relationship to mental health problems among 12-to 15-year-old Norwegian adolescents. *European child & adolescent psychiatry*, 19(11), 803-811.
- Yoon, J.S. & Kerber, K. (2003). Bullying: Elementary Teachers' Attitudes and Intervention Strategies. *Research in Education* 69(-1):27-35. DOI: 10.7227/RIE.69.3.

Akran Zorbalığı Ölçeği (1 = Son bir kaç ayda okulda zorbalık yapmadım, 2 = yalnızca bir veya iki kez oldu, 3 = ayda 2 veya 3 kez, 4 = haftada bir kez ve 5 = haftada birkaç kez oldu)

1	Arkadaşlarıma kötü isimler (lakap) taktım ya da can sıkıcı bir şekilde dalga geçtim	1	2	3	4	5
2	Diğer öğrencileri bilerek terk ettim, arkadaş grubundan çıkardım veya tamamen görmezden geldim	1	2	3	4	5
3	Arkadaşıma vurdum, tekmeledim, ittim ya da biryere kilitledim.	1	2	3	4	5
4	Arkadaşlarım arasında yalan söylentiler çıkarttım ve yalan söylentiler yayarak diğerlerinin onları sevmemesini sağladım	1	2	3	4	5
5	Diğer öğrencilerin ırkları hakkında yorumda bulunarak zorbalık yaptım	1	2	3	4	5
6	Diğer öğrencilerin dinleri hakkında yorumda bulunarak zorbalık yaptım	1	2	3	4	5
7	Diğer öğrencilere olumsuz içerikli şaka ve yorumlar yaptım	1	2	3	4	5
8	Başka bir öğrenciyi bilgisayar, e-posta mesajı veya resim kullanarak zorbalığa uğrattım	1	2	3	4	5
9	Başka bir öğrenciye bir cep telefonu kullanarak zorbalık ettim	1	2	3	4	5
10	Bir bilgisayar, e-posta mesajları veya resimler kullanarak okul dışındaki diğer kişilere zorbalık yaptım	1	2	3	4	5
11	Bir cep telefonu kullanarak okul dışındaki diğer insanlara zorbalık yaptım	1	2	3	4	5

Peer Victimization and Its Relationship To Self-Esteem And Loneliness In Primary And Middle School Students With Special Needs

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Abstract

Peer victimization can have short and long-term serious consequences on children's psychosocial adjustment. Several risk factors for peer bullying and victimization in children have been identified. Children with special needs are at an increased risk of being victimized in school. However, little research has addressed to investigate peer victimization and its relation to psychosocial functioning in children with special needs. The aims of this cross-sectional study were to identify the prevalence rates of peer victimization among students with and without special needs in inclusive classrooms; to compare both groups in terms of the levels of peer victimization; and to examine the relationships of peer victimization with self-esteem and loneliness in students with special needs. A total of 422 students (female=186, male=236) aged 7 to 14 participated in this study. Of these participants, 197 were students with special educational needs (SEN) and 225 were students without special educational needs (non-SEN) attending 2nd-4th grades of primary schools and 5th-6th grades of middle schools. Students' self-reports on peer victimization, self-esteem, and loneliness were collected using the Peer Bullying Scale, the Coopersmith Self-Esteem Inventory, and the Children's Loneliness Scale. In the findings of the study, the overall peer victimization rates were found to be %28 for non-SEN students and %45.6 for SEN students. While the most frequent type of victimization reported by the non-SEN students was verbal victimization, for the SEN students it was being socially isolated. Attack on property was the least common type of peer victimization reported by both groups. The results also revealed that SEN students were more victimized by all types of peer bullying investigated in this study when compared to typically developing students. Additionally, it was found that being socially isolated and physically bullied significantly predicted the self-esteem of SEN students, whereas being isolated and verbally bullied were found to be significant predictors of the feelings of loneliness in these students. The findings of the study were discussed regarding the related literature.

Keywords: *Peer bullying, peer victimization, self-esteem, loneliness, children with special needs*

Introduction

Peer bullying and victimization is a common problem among students in school. Bullying, which is a sub-form of aggression (Kubiszewski, Fontaine, Potard, & Gimenes, 2014), is defined as a situation in which a student is constantly subjected to negative behaviors by one or more people despite the fact that there is no provocation (Olweus, 1997; Piskin, 2003). Increasingly in recent years, it has been indicated that many students are exposed to or perpetrate aggression in school (Olweus, 1993, Piskin, 2003). In order for negative behaviors such as inappropriate physical contact, verbal harassment, spreading rumors, or exclusion to be considered as peer bullying, these behaviors must be repetitive and intentional; and there must be an imbalance in power among peers (Olweus, 1997). While the perpetrator who is bullying is defined as the bully and the one who is being bullied is defined as the victim, some children can be both bully and victim (Kapci, 2004).

The studies investigating peer bullying/victimization at school have revealed different prevalence rates. In a study involving 130,000 students in Norway, it was found that 15% of students aged 8-16 involved in bullying as a bully, a victim, or a bully/victim (Olweus, 1993). Piskin and Ayas (2011) indicated that there were several studies in various countries which have reported that the bullying rates were between 15-25% and the victimization rates were between 6-50%. Within the scope of the World Health Organization's project called "School Age Children's Health", which was carried out in 35 countries, among high school students in Turkey, 22% of them were found to be victims, 9.2% of them were to be bullies and 9.4% of them were both bully/victim (Alikasifoglu, Erginoz, Ercan & Ilter, 2006). In other studies conducted with Turkish children, it was indicated that 35% of primary school students were found to be victims, 30.2% were to be bullies, and 6.2% were both bullies/victims (Piskin, 2003) and about 40% of 4th and 5th grade students were exposed to peer bullying (Kapci, 2004).

Bullying can be either direct or indirect towards peers. Direct bullying consists of acts of physical violence, insults, humiliation, hand gestures, and ugly gesture mimicry whereas behaviors such as isolation, exclusion, and spreading rumor are called indirect bullying (Hong & Espelage, 2012). Indirect bullying is also referred to as "social bullying" since it involves "non-verbal aggression" (Underwood, 2003) or as "relational bullying" (Crick & Bigbee, 1998). Students who are directly exposed to bullying may know who the bully is, however in indirect bullying victim often does not know who the bully is and can only guess. This situation leads to difficulties in the identification and intervention of the peer bullying (Gultekin, 2003). Bullying behaviors have also been classified into different subcategories according to its form and characteristics in order to identify the peer bullying more clearly and to increase the effectiveness of the interventions. The most accepted classification in the literature is Olweus' (1993) classification which consists of three types of bullying such as physical bullying, social exclusion, and verbal bullying. Also, Mynard and Joseph's (2000) classification consists of four types of bullying; physical, verbal, relational, and attacks on personal belongings whereas Elliott (1997) defined four types of bullying as physical, verbal, emotional, and threatening. Moreover, Piskin (2005) described five types of bullying such as physical bullying, verbal bullying, isolation, rumor spreading, and attacks on property. In addition to these traditional types of bullying, studies on sexual bullying (Piskin and Ayas, 2005) and cyber bullying (Aydın-Gorucu, 2016) have also been conducted in the following years.

Several studies have revealed different prevalence rates for each type of peer bullying. Vlachou, Botsoglou and Andreou (2014) indicated that the prevalence rates are between 28-53% for physical bullying and social exclusion; between 12-50% for verbal bullying; and between 1.2-32.4% for rumor spreading. In a recent study conducted with 425 students aged 6-9 in the United States, 19.18% of children experienced direct bullying and 20.87% of them experienced indirect bullying (Studt & Renner, 2014). In another study conducted with 2,500 children in Sweden, it was determined that children were exposed to physical bullying most frequently (57.6%) and sexual bullying least frequently (11.0%) (Miller-Graff, Cater, Howell, & Graham-Bermann, 2015). Pellegrini (2002) stated that males are more likely to experience physical bullying and females are more likely to experience relational and indirect bullying. In several studies in Turkey, it is determined that victims are exposed to physical and verbal bullying most frequently and to emotional and sexual bullying least frequently (Çinkır & Karaman-Kepeneci, 2003; Kapci, 2004). In the study of Çinkır and Karaman-Kepeneci (2003), the peer victimization rates were found to be 44% for verbal bullying, 30% for physical bullying, 9% for sexual bullying, and 1% for emotional bullying. In a study conducted by Piskin (2003), 34% of the victims were found to be physically bullied, 29% to be verbally bullied, 21% to be exposed to indirect bullying and 11% to be exposed to property damage. In another study, it was found that students were exposed to pushing (63%) at the most, following by swearing (57%), name calling (56%), teasing (49%), damaging property (45%), and rumor spreading (%44) (Yurtal & Cenkseven, 2006).

In recent years, there has been an increasing effort in examining the relationship between peer victimization and psychosocial adjustment of children. Related studies indicate that peer victimization can have short- and long-term negative consequences for children's psychosocial adjustment (see Wolke & Lereya, 2015, for a review). Studies have shown that children/adolescents who are victimized tend to have lower self-esteem (Juvonen, Nishina, & Graham, 2000; Kapci, 2004; Piskin & Ayas, 2005), experience more peer rejection (Pekel-Uludagli & Ucanok, 2005) and loneliness (Boivin, Hymel, & Bukowski, 1995; Graham & Juvonen, 1998; Storch & Masia-Warner, 2004), have higher levels of anxiety and depression (Juvonen, Graham, & Schuster, 2004; Kapci, 2004; Fleming & Jacobsen, 2009), and have more frequent school related problems (Çinkır, 2006; Karaca, 2018).

Findings of the studies on consequences of peer bullying have led researchers to investigate the risk factors associated with the bullying involvement (as a bully, as a victim, or as a bully/victim). In these studies, personal characteristics such as gender, age, grade, and ethnicity have been examined as well as social contexts such as family, peer group, and school, and various psychosocial variables in relation to bullying involvement (see, Craig, Peters, & Konarski, 1998; Dake, Price, & Telljohann, 2003; Card and Hodges, 2008, for reviews). It was indicated that bullies had a negative family environment, had a tendency to be delinquent and substance abuse, were aggressive, had problems in social relations, and had low academic achievement. On the other hand, the review articles mentioned above also reported that victims were tend to be physically weak and were not able to protect themselves, they were more sensitive, shy, had difficulties in social relations, had lower self-esteem and social competence, experienced internalizing problems such as loneliness, depression, anxiety, and also displayed some externalizing problems such as hyperactivity and emotional dysregulation.

When the risk factors identified for peer victimization among typically developing children mentioned earlier are taken into consideration, it is reasonable to state that children with disabilities or special educational needs are at an increased risk for peer victimization in school. Some circumstances associated with the disability (e.g. visibility of disability; Rose, Monda-Amaya, & Espelage, 2011), and the social and behavioral characteristics of children with special needs such as social skills deficits, behavioral problems, difficulties in peer relations (Kucuker &

Cifci-Tekinarslan, 2015), and peer rejection (Kavale & Forness, 1996) may leave them vulnerable to peer bullying/victimization. Baumeister, Storch, and Geffken (2008) reported that peer victimization was also positively correlated with thought problems, attention problems, disruptive behavior, and social problems of children with learning disabilities. Research indicated that the peer victimization rate among children with special needs was higher than typically developing peers (Bear, Mantz, Glutting, Yang, & Boyer, 2015; Wiener & Mak, 2009). In a recent review of studies on peer bullying and victimization among students with special needs (Rose et al., 2011), the victimization rates were reported to be in excess of 50% which indicated that children with special needs became targets of peer victimization more frequently than their typical peers.

In the literature, although there have been a considerable number of studies on peer bullying and victimization among typically developing children, empirical studies investigating this topic in children with special needs are still rather limited. In Turkey, there have also been only a few studies on peer victimization of children with special needs (Orengul, 2013, Aydın-Gorucu, 2016). Studies involving children with special needs have focused on examining the differences in peer bullying and victimization rates among these children regarding the type and severity of their disability, different educational settings, and also comparing their bullying and victimization rates with those of typical peers (see Rose et al., 2011; Sentenac et al., 2012, for reviews). However, there is a need for further research on peer victimization and its relation to psychosocial adjustment in children with special needs since there have been a limited number of studies on this subject. Therefore, the aims of this study are to identify the types and prevalence of peer victimization among students with and without special needs in inclusive classrooms, to compare both groups in terms of the levels of various peer victimization types, and to examine the relationships of peer victimization with self-esteem and loneliness, as indicators of psychosocial adjustment, in students with special needs. The results of this study may add valuable information to guide the planning of appropriate anti-bullying interventions for children with special needs.

Answers to the following questions are sought in the study:

- 1) What are the types and prevalence rates of peer victimization among students with and without special educational needs in inclusive primary and middle school classrooms?
- 2) Are there any significant differences between students with and without special educational needs in inclusive classrooms in terms of the levels of peer victimization types they experience?
- 3) Are the various types of peer victimization significant predictors of self-esteem of students with special educational needs in inclusive classrooms?
- 4) Are the various types of peer victimization significant predictors of loneliness levels of students with special educational needs in inclusive classrooms?

Method

Participants

Students with and without special educational needs (SEN students, n=197; non-SEN students, n=225) from 2nd, 3rd, and 4th grades of regular primary schools and from 5th and 6th grades of regular middle schools in the province of Denizli, Turkey participated in this cross-sectional study. Of these 422 students, 186 were female (44.1%) and 236 (55.9%) were male. A hundred and three of the students were in the 2nd grade, 92 were in the 3rd grade, 79 were in the 4th grade, 61 were in the 5th grade, and 87 were in the 6th grade. The ages of the non-SEN students are between 7-13 ($x = 10.02$, $sd = 1.468$) and the ages of the SEN students are between 7-14 ($x = 9.79$, $sd = 1.595$). Non-SEN students that participated in the study as a comparison group were recruited from a total of 15 classes in 3 primary and 3 middle schools that were randomly selected from schools in the province of Denizli in order to represent different socio-economic levels. On the other hand, a sufficient number of SEN students can be recruited from a large number of primary and middle schools because of the small number of special needs students attending inclusive classrooms in regular schools. Based on the information gathered from the teachers, SEN students who have gained literacy skills were included in the study. A total of 111 (56.3%) of the SEN students were diagnosed with learning disability, 78 (39.6%) were diagnosed with mild intellectual disability, and 8 (4.1%) with autism spectrum disorder according to the assessment procedures officially done by Guidance and Research Centers. Demographic characteristics of the SEN and non-SEN students are presented in Table 1.

Table 1. Demographic Characteristics of the Students with and without Special Needs

		SEN* Students (n=197)		non-SEN** Students (n=225)	
		n	%	n	%
Gender	Female	77	39.1	109	48.4
	Male	120	60.9	116	51.6
Grade	2	59	29.9	44	19.6
	3	44	22.3	48	21.3
	4	36	18.3	43	19.1

	5	23	11.7	38	16.9
	6	35	17.8	52	23.1
Type of disability	Learning disability	111	56.3		
	Intellectual disability	78	39.6		
	Autism spectrum disorders	8	4.1		

*SEN: Students with special needs

**non-SEN: Students without special needs

Measures

Peer Bullying Scale-Child Form, Coopersmith Self-Esteem Inventory, Children's Loneliness Scale and a demographic information questionnaire were used to collect data in the study.

Peer bullying/victimization scale (PB/VS): In this study, the Peer Bullying/Victimization Scale (PB/VS)-Child Form developed by Piskin and Ayas (2007, 2011) was used to assess the victimization experienced by students with and without special needs. The PB/VS has both child and adolescent forms. In both forms, participant is responding to the same items in two separate dimensions. The children are instructed to answer how often they are bullied by other children in the first dimension (the Victim Scale-VS) and how often they bully others in the second dimension (the Bully Scale-BS). In the PB/VS, bullying behaviors described under five categories as follows: physical bullying (hitting, kicking, pushing etc.), verbal bullying (insulting, calling names, making fun of somebody, teasing, swearing etc.), isolation/ exclusion (isolating, ignoring etc.), rumor spreading (telling bad things behind their back, telling false stories etc.), and attack on property (taking things or money, stealing, deliberately damaging property of others etc.). There are a total of 37 items in the PB/VS-Child Form. A short explanation is given about what bullying or being bullied means on the first page of the instrument. Children are asked to respond to the scale items on a five-point scale for each dimension: "almost every day=4", "at least once a week=3", "once a month=2", "once a term=1" or "never=0" (Piskin & Ayas, 2011). The total score ranges from 0 to 148, with higher scores indicating higher levels of peer bullying /victimization. Piskin and Ayas (2011) conducted confirmatory factor analysis (CFA) to examine the construct validity of the PB/VS-Child Form in students attending 3rd, 4th, and 5th grades; the results showed that the five-factor model was confirmed for both the VS and the BS subscales. The Cronbach's alpha coefficients for the VS and the BS scales were found to be .90 and .87, respectively. In the current study, only the Victim Scale (VS) was used to assess the peer victimization of the SEN and non-SEN students, and Cronbach's alpha coefficient for the SEN students was calculated as .93 (n=197) and for the non-SEN students as .87 (n=225).

Coopersmith Self-Esteem Inventory (CSEI): The Coopersmith Self-Esteem Inventory (CSEI, Coopersmith, 1991) was used to assess global self-esteem of the SEN students. There are many studies that support the validity and reliability of the widely used CSEI to evaluate the self-esteem of children and adolescents that are older than 8 years of age (Coopersmith, 1991; Piskin, 1996). Eight out of 58 items in the CSEI are indicative of defensive attitudes (the lie subscale) and are not included in the scoring. Participants are asked to respond to scale items in the form of "like me" or "unlike me". Responses pointing to high self-esteem are given 1 point, and those pointing to low self-esteem are given 0 point. A total score (a global self-esteem evaluation) and five subscale scores (General Self-esteem, Social-Peers Self, Home-Parents, School-Academic, and Lie) are obtained from the scale (Piskin, 1996). Scores ranged from 0 to 50, and the increase in points indicates higher self-esteem (Kapci, 2004). It is suggested that CSEI can be used for assessment in both primary schools (with 3rd, 4th, and 5th grade students; Gucray, 1989) and high schools (Piskin, 1996). The internal consistency coefficient of the scale was found to be higher than .80 and the test-retest reliability coefficient of .70 was obtained with an interval of two-weeks in the study conducted by Gucray (1989) with children of various ages and genders. In the same study, the correlation of the CSEI with the Piers-Harris Self-Concept Scale was found to be .72. In the present study, the Cronbach alpha coefficient of the CSEI was found to be .87 for the SEN students (n = 197).

Children's Loneliness Scale (CLS): In this study, The Children's Loneliness Scale (CLS) was used to assess the loneliness levels of SEN students. Asher, Hymel and Renshaw (1984) developed the CLS to evaluate 3rd-6th graders' levels of loneliness and dissatisfaction from social relationships, and Asher and Wheeler (1985) had made modifications in some of the items of the CLS in order to reflect school-based loneliness (e.g. 'I feel alone at school' instead of 'I feel alone'). The scale has 24 items, 16 of them are related to the feelings of loneliness, perceptions of social competence, and status among peers. The CLS includes eight "filler" items that focus on hobbies and interests (e.g., "I like music") and are not to be included in the scoring. The children respond to the items on a five-point scale (always true = 5, not true at all = 1). The total scores ranged from 16 to 80, and higher scores indicate higher levels of loneliness (Cifci-Tekinarslan & Kucuker, 2015). Several studies have reported that the CLS consisted of a single factor (Asher & Wheeler, 1985; Cassidy & Asher, 1992; Kaya, 2005; Cifci-Tekinarslan & Kucuker, 2015.) The internal consistency coefficients of CLS are reported as .78-.90 (Asher et al., 1984; Galanaki, Polychronopoulou & Babalis, 2008; Kaya, 2005). In Turkey, the psychometric properties of the

CLS were investigated on the typically developing students attending 3rd-8th grades (Kaya, 2005), and on the 4th-5th graders with and without special needs (Cifci-Tekinarslan & Kucuker, 2015). In these studies, CLS has demonstrated a one-factor structure; high internal consistency ($\alpha = .87$) and test-retest reliability (.76-.87). In the present study, the Cronbach alpha coefficient of the CLS was found to be .88 for the SEN students ($n = 197$).

Procedure

At the spring semester of the 2017-2018 school year, a list of primary and middle schools that have students with special needs and legal permission to conduct the study were obtained from the National Education Directorate. Information about the purpose of the present study was given to the school principals and teachers of primary and middle schools that were randomly selected from the regions, representing different socio-economic levels of the province of Denizli, and their approvals for the study were obtained. Also, participating students were informed about the study before the administration of the instruments. It is stated that students will be asked some questions about themselves, about their friendships, and about the difficulties they may have in school, that information they are going to give will be confidential, and participation in this study is voluntary. Non-SEN students filled in self-reported instruments in their own class as a group. For SEN students, the instruments were individually administered by the researchers in an out-of-class environment and necessary explanations and assistance were provided to the students who requested it. After the administration of the instruments was finished, the students were thanked for their participation.

Data Analysis

Concerning the first question of the study, descriptive statistics such as frequency and percentage, were calculated to find out the prevalence of the types of peer victimization for the SEN and non-SEN students. In order to determine whether the both groups differed in the levels of peer victimization types, the VS total and subscales scores of both groups were examined regarding the assumptions of parametric tests. The results of the Levene's test showed that variances for the VS total and subscales scores of SEN and non-SEN students were not equal. The distributions of the VS scores for both groups were also checked for normality assumptions. Skewness and kurtosis values for the VS scores of non-SEN students were found to be higher than 1 indicated that the scores did not normally distributed. Therefore, the non-parametric Mann Whitney-U test for unrelated samples was used to compare the VS scores of SEN and non-SEN students. To address the third and fourth questions of the present study, analyzes were conducted with the group of SEN students ($n=197$). Stepwise multiple regression analyzes were performed to determine the predictive powers of the types of peer bullying victimization on self-esteem (CSEI total score) and loneliness levels of SEN students. Prior to the analysis, the data sets related to self-esteem and loneliness of SEN students were examined for the assumptions of multiple linear regression analysis. The outliers were examined via calculation of Mahalanobis distance values, and no outlier was found in both data sets. Pearson correlation coefficients between the predictive (independent) variables, tolerance values, and VIF (variance inflation factor) values indicated that there was no multicollinearity among predictive variables (Cokluk, Sekercioglu, and Buyukozturk, 2014). Based on these findings, the data were analyzed using a stepwise multiple linear regression method.

Results

The findings of the research questions are presented in this section.

1. Types and Prevalence Rates of Peer Victimization among Students with and without Special Needs

In order to find out the types and the prevalence rates of bullying behaviors experienced by primary and middle school students with and without special needs in inclusive classrooms, the frequencies and percentages of the students' responses to the items in the VS subscales were calculated. The findings are presented in Table 2.

Table 2. *The prevalence rates of bullying behaviors experienced by SEN and non-SEN students*

Types of bullying	Bullying behaviors	SEN Students	Non-SEN Students
		n (%)	n (%)
Physical bullying	1. Attacking with cutting instruments	20 (10.2)	8 (3.6)
	2. Stabbing with sharp objects	35 (17.8)	39 (17.3)
	3. Kicking or punching	75 (38.1)	81 (36.0)
	4. Hitting with an object	57 (31.0)	37 (16.4)
	5. Pushing with shoulder, hitting with elbow	88 (44.7)	83 (36.9)
	6. Pulling hair or ears, pinching or biting	95 (48.2)	65 (28.9)
	7. Pulling down by pushing or twisting arms	82 (41.6)	42 (18.7)
	8. Throwing objects or water	111 (56.3)	73 (32.4)
	9. Disturbing by touching with hands or tickling	126 (64.0)	117 (52.0)

	10. Putting an uncomfortable object underneath	48 (24.4)	30 (13.3)
	Physical victimization	37.6%	25.5%
	11. Swearing or telling insulting words like stupid, idiot etc.	121 (61.4)	110 (48.9)
Verbal bullying	12. Unpleasant name-calling	117 (59.4)	106 (46.1)
	13. Making fun about physical appearance	94 (47.8)	61 (26.1)
	14. Making fun of accent, pronunciation or stuttering	81 (41.1)	42 (18.7)
	15. Teasing or annoying him/her	147 (74.6)	137 (60.9)
	16. Threatening	74 (36.0)	52 (23.1)
	Verbal victimization	53.4%	37.3%
Isolation	17. Doesn't include in games	122 (61.9)	116 (51.6)
	18. Isolating, not accepting in the group	117 (59.4)	66 (29.3)
	19. Not speaking to, not answering to questions	118 (59.9)	89 (39.6)
	20. Prevent other students making friends with	88 (44.7)	29 (12.9)
	21. Deliberately not giving the pass, while playing football	113 (57.4)	80 (35.6)
	Victimization by isolation /exclusion	56.7%	33.8%
Rumor spreading	22. Spreading rumors/gossip	78 (41.6)	66 (29.3)
	23. Accusing for things he/she hasn't done	100 (50.8)	72 (32.0)
	24. Undermine relationship among friends by spreading gossips	72 (36.6)	63 (28.0)
	25. Writing ugly words about him/her	59 (29.9)	39 (17.3)
	26. Complaining to teacher for something he/she hasn't done.	129 (65.5)	45 (20.0)
	27. Telling someone's secrets to others	76 (38.6)	53 (23.6)
	28. Snitching	127 (64.5)	77 (34.2)
		Victimization by rumor spreading	46.8%
Attack on property	29. Taking his/her money or belongings forcibly	23 (26.9)	19 (8.4)
	30. Stealing his/her money or belongings	40 (20.3)	21 (9.3)
	31. Purposefully damage to his/her belongings	80 (39.6)	48 (21.3)
	32. Scribble or blacken books or notebooks	110 (55.8)	57 (25.3)
	33. Taking someone's ball and run away	96 (48.7)	66 (29.4)
	34. Tearing or soiling the clothes	48 (24.4)	20 (8.9)
	35. Sneaking through his/her bag or personal items	56 (29.0)	38 (16.9)
	36. Forcing to buy goods from the canteen	44 (22.3)	24 (10.7)
	37. Not giving back the borrowed money / items	68 (34.5)	47 (20.9)
	Victimization by attack on property	33.5%	16.8%
	Overall victimization	45.6%	28%

*SEN: Students with special needs

**non-SEN: Students without special needs

As seen in Table 2, while the overall victimization rate was found to be 28% for non-SEN students, it was found as 45.6% for SEN students. These results indicated that more than one-quarter of the non-SEN students and about half of the SEN students experienced some forms of peer bullying at frequencies varying from "once a term" to "almost every day". Similar to the overall victimization rate, the SEN students' rates of victimization by isolation (56.7% vs. 33.8%), verbal bullying (53.4% vs. 37.3%), rumor spreading (46.8% vs. 26.4%), physical bullying (37.6% vs. 25.5%), and attacks on property (33.5% vs. 16.8%), were higher than the rates of non-SEN students. The most frequent type of peer victimization reported by non-SEN students was by verbal bullying, followed by isolation, rumor spreading, physical bullying, and attacks on property. On the other hand, the most common type of peer victimization reported by SEN students was victimization by social isolation/exclusion, followed by verbal bullying, rumor spreading, physical bullying, and attacks on property. The attacks on property was the least common type of peer victimization experienced by both SEN and non-SEN students. Among the verbal bullying behaviors, both of SEN and non-SEN students reported that they were subjected to teasing, annoying, swearing, name-calling or insulting (words like stupid, silly or idiot, etc.) the most frequently. In terms of the isolation dimension, while about half of the non-SEN students only reported that they were not taken into the games (51.6%), more than half of the SEN students reported that they were not taken into the games (61.9%), they were not talked to (59.9%), and they were not accepted to the group (59.4%). Among the rumor spreading behaviors, while non-SEN students reported most frequently that they were exposed to snitching (34.2%), majority of the SEN students reported most frequently that they were subjected to snitching (64.5%) and complaining to the teacher (65.5%). It was found that both SEN and non-SEN students were most exposed to disturbing by touching with hands or tickling among physical bullying behaviors. In *attacks on property* dimension, it was found that SEN students were more exposed to scribbling or blackening books or notebooks.

2. Comparison of the Students with and without Special Needs Regarding the Levels of Peer Victimization Types

The second objective of the study was to determine whether there were significant differences between students with and without special needs regarding the levels of peer victimization types. For this purpose, the Victimization Scale total scores and the subscales scores of the two groups were compared with the non-parametric Mann-Whitney U test for unrelated samples. Descriptive statistics of the SEN and non-SEN students' Victimization Scale scores by bullying types are presented in Table 3, and the results of Mann Whitney-U test are presented in Table 4.

Table 3. Descriptive Statistics of the VS Total Scale and Subscale Scores of the SEN* and non-SEN Students**

Variables	SEN Students (n=197)		non-SEN Students (n=225)	
	x	sd	x	sd
Physical bullying	7.15	6.80	5.04	5.42
Verbal bullying	7.71	5.63	5.70	4.97
Isolation	6.69	5.10	3.80	3.49
Rumor spreading	7.12	5.86	3.50	4.30
Attacks on property	5.95	6.40	2.70	3.34
VS total scale	34.63	23.99	20.74	16.17

*SEN: Students with special needs

**non-SEN: Students without special needs

As seen in Table 4, significant differences were found between the students with and without special needs in terms of the victimization by physical bullying (U = 18289.50, p = .002), verbal bullying (U = 1.75, p = .000), isolation (U = 1.49, p = .000), rumor spreading (U = 1.35, p = .000), attacks on property (U = 15271.50, p = .000) and the VS total scale (U = 1.44, p = .000). Compared to non-SEN students, SEN students reported more victimization of verbal bullying, physical bullying, isolation, rumor spreading, attacks on property, and overall victimization.

Table 4. Mann Whitney-U Test Results to Compare the VS Total and Subscales Scores of the SEN* and non-SEN Students**

Variables	SEN Students (n=197)		non-SEN Students (n=225)		U	z	p
	Mean rank	Sum of Ranks	Mean Rank	Sum of Ranks			
Physical bullying	231.16	45538.5	194.29	43714.5	18289.5	-3.12	.002
Verbal bullying	235.10	46314	190.84	42939.0	1.75	-3.73	.000
Isolation	248.40	48935.5	179.19	40317.5	1.49	-5.85	.000
Rumor spreading	255.47	50328	173.00	38925.0	1.35	-6.99	.000
Attacks on property	246.48	48556.5	180.87	40696.5	15271.5	-5.59	.000
VS total scale	250.87	49420.5	177.03	39832.5	1.44	-6.20	.000

*SEN: Students with special needs

**non-SEN: Students without special needs

3. The role of peer victimization in predicting self-esteem of students with special needs

A stepwise regression analysis was conducted to determine the predictive powers of the types of peer bullying victimization on self-esteem of SEN students in inclusive classrooms. The relationships between the independent variables (*physical bullying, verbal bullying, isolation, rumor spreading and attacks on property*) and the dependent variable (*self-esteem*) were examined by the Pearson product moment correlation analysis and the correlation coefficients obtained are presented in Table 5.

Table 5. Correlations between Self-Esteem and Independent Variables

Variables	1	2	3	4	5	6	7
1. Physical bullying	-						
2. Verbal bullying	.50**	-					
3. Isolation	.40**	.56**	-				
4. Rumor spreading	.55**	.65**	.57**	-			
5. Attack on property	.65**	.54**	.52**	.65**	-		
6. VS total score	.79**	.80**	.74**	.84**	.85**	-	

7.CSEI Global self-esteem	-.33**	-.35**	-.50**	-.38**	-.35**	-.47**	-
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N=197, p<0.01

As seen in Table 5, there was a significant negative correlation between the CSEI global self-esteem and the VS total score of SEN students ($r=-.47, p<.01$). While the highest negative correlation was found between isolation and self-esteem ($r=-.50, p<.01$); rumor spreading ($r=-.38, p<.01$), verbal bullying ($r=-.35, p<.01$), attacks on property ($r=-.35, p<.01$), and physical bullying ($r=-.33, p<.01$) also showed significant relationships with self-esteem negatively. As the VS total score had correlations greater than .70 with the Victimization subscales, the VS total score was not included in the regression analysis, only the subscale scores of physical bullying, verbal bullying, isolation, rumor spreading, and attacks on property were taken.

Stepwise multiple regression analysis was performed to determine the predictive powers of independent variables on self-esteem of SEN students. As seen in Table 6, the variables *verbal bullying*, *rumor spreading*, and *attacks on property* were not processed in stepwise regression analysis because they did not significantly predict the self-esteem of the SEN students, hence the other two variables, *isolation* and *physical bullying* were included into the regression model. In the first step of the analysis, the *isolation* variable was introduced to the regression model. The standardized regression coefficient for the *isolation* variable in predicting the self-esteem of SEN students was found as $\beta=-.502$. The *isolation* variable significantly predicted the self-esteem of SEN students ($t=-8.114, p<.01$), and explained 25% of the total variance of the self-esteem scores alone ($R^2=.252, F_{reg}(1,195) = 65.840, p=.000$).

Table 6. Stepwise Regression Analysis Results to Predict Self-Esteem of Students with Special Needs

Model	B	Std. error	β	t	p	Zero-order r	Partial r	R	R ²	F
1 (constant)	37.461	.870		43.08	.000			.502	.252	65.84**
Isolation	-.839	.103	-.502	-8.11	.000	-.502	-.502			
2 (constant)	38.126	.911		41.84	.000			.521	.271	36.07**
Isolation	-.738	.112	-.442	-6.60	.000	-.502	-.428			
Physical bullying	-.187	.084	-.149	-2.23	.027	-.328	-.158			

**p<.01

In the second step of the Stepwise regression analysis, the *physical bullying* variable was included into the model. When the other variables explaining self-esteem held constant, the variables *isolation* and *physical bullying* together explained 27% of the total variance in the self-esteem scores ($R^2=.271, F_{reg}(2,194) = 36.072, p = .000$). According to these results, the *physical bullying* variable made a significant contribution to the total variance of the self-esteem scores by about 2% ($\Delta R^2=.019, F_{change}(1,194) = 4.965, p=.000$). In this step, the standardized regression coefficients in predicting the self-esteem of SEN students were found to be $\beta = -.442$ for the *isolation* variable and $\beta=-.149$ for the *physical bullying* variable. Isolation/exclusion by peers ($t = -6.60, p=.000$) and exposure to physical bullying ($t = -2.23, p=.027$) significantly predicted the self-esteem of SEN students. It was found that the most important predictor of self-esteem was *isolation*, followed by *physical bullying*, and both variables were negatively related to self-esteem.

4. The role of peer bullying on predicting loneliness levels of students with special needs

A stepwise regression analysis was performed to determine the predictive powers of the types of bullying victimization on loneliness levels of SEN students in inclusive classrooms. Prior to the regression analysis, the relationships between the types of bullying victimization (independent variables) and loneliness (dependent variable) were examined by the Pearson product moment correlation analysis and the correlation coefficients obtained are presented in Table 7.

Table 7. Correlations between Loneliness and Independent Variables

Variables	1	2	3	4	5	6	7
1. Physical bullying	-						
2. Verbal bullying	.50**	-					
3. Isolation	.40**	.56**	-				
4. Rumor spreading	.55**	.65**	.57**	-			
5. Attack on property	.65**	.54**	.52**	.65**	-		

6.VS total score	.79**	.80**	.74**	.84**	.85**	-	
7.Loneliness	.33**	.42**	.53**	.40**	.35**	.50**	-

N=197 p<.01

As seen in Table 7, there was a significant positive correlation between the loneliness and the VS total score of SEN students ($r=.50, p<.01$). When the subscales were examined, the highest correlation with loneliness was found between *isolation* score ($r=.53, p<.01$) and *verbal bullying* score ($r=.42, p<.01$); *rumor spreading* ($r=.40, p<.01$), *attacks on property* ($r=.35, p<.01$), and *physical bullying* ($r=.33, p<.01$) also showed significant relationships with loneliness positively. As the VS total score had correlations greater than .70 with the VS subscales, the VS total score was not included in the regression analysis, only the subscale scores of *physical bullying*, *verbal bullying*, *isolation*, *rumor spreading*, and *attacks on property* were taken. Stepwise multiple regression analysis was performed to determine the predictive powers of independent variables on the loneliness levels of SEN students and the results are given in Table 8.

Table 8. Stepwise Regression Analysis Results to Predict Loneliness in SEN Students

Model	B	Std. Hata	β	t	p	Zero-order r	Partial r	R	R ²	F
1 (constant)	28.664	1.149		24.94	.000			.533	.284	77.38**
Isolation	1.202	.137	.533	8.79	.000	.533	.533			
2 (constant)	27.372	1.250		21.89	.000					
Isolation	.975	.163	.432	5.97	.000	.533	.394	.553	.306	42.72**
Verbal bullying	.364	.148	.178	2.46	.015	.328	.174			

**p<.01

As seen in Table 8, the variables *physical bullying*, *rumor spreading*, and *attacks on property* were not included in the stepwise regression analysis because they did not significantly predict the loneliness in SEN students, hence the other two independent variables, *isolation* and *verbal bullying* were included into the regression analysis. In the first step of the analysis, the *isolation* variable was introduced to the regression model. The standardized regression coefficient for the *isolation* variable in predicting the loneliness levels of SEN students was found as $\beta=.533$. The *isolation* variable significantly predicted the loneliness levels of SEN students ($t=8.79, p<.01$), and explained 28.4% of the total variance of the loneliness scores alone ($R^2=.284, F_{reg}(1,195)=77.38, p=.000$).

In the second step of the stepwise regression analysis, the *verbal bullying* variable was included into the model. When the other variables explaining loneliness were held constant, the variables *isolation* and *verbal bullying* together explained 30.6% of the total variance in the loneliness scores ($R^2=.306, F_{reg}(2,194)=42.72, p=.000$). According to these results, the *verbal bullying* variable made a significant contribution to the total variance of loneliness scores by 2% ($\Delta R^2=.022, F_{change}(1,194)=6.054, p=.000$). In this step, the standardized regression coefficients in predicting the loneliness levels of SEN students were found to be $\beta=.432$ for the *isolation* variable and $\beta=.178$ for the *verbal bullying* variable. *Isolation/exclusion by peers* ($t=5.97, p=.000$) and *exposure to verbal bullying* ($t=2.46, p=.015$) significantly predicted the loneliness levels of SEN students. When the relative importance of the predictive variables on loneliness was examined according to the standardized regression coefficient (β), it was found that the most important predictor of loneliness was the *isolation* variable, followed by *verbal bullying*, and both variables were positively correlated with loneliness.

Discussion

In this study, firstly the prevalence of peer victimization in students with (SEN) and without special needs (non-SEN) in inclusive classrooms were examined and then two groups were compared in terms of the levels of various peer victimization forms they experienced. Additionally, the predictive relationships of different types of peer victimization with self-esteem and loneliness levels of students with special needs were investigated. When the overall peer victimization rates for SEN students and non-SEN students were examined, the results indicated that more than a quarter of non-SEN students (28%) and about half (45.6%) of SEN students with special needs were exposed to some forms of peer bullying. As well as the overall rate of peer victimization, SEN students were found to have higher rates of victimization by social isolation/exclusion, verbal bullying, physical bullying, rumor spreading, and attacks on property than their non-SEN peers. The overall victimization rate for the SEN students in the current study is similar to the results of previous studies. In a review of related literature, Rose et al. (2011) reported that studies generally revealed the victimization rates to be in excess of 50% for children with disabilities.

In the second part of the present study, significant differences were found between SEN and non-SEN students in terms of the levels of overall and different types of victimization. These findings indicated that SEN students in inclusive classrooms were more victimized by verbal bullying, physical bullying, isolation, rumor spreading, and attacks on property as well as overall bullying than their typical peers. Several studies on peer victimization in children with disabilities also reported similar findings (Sabornie, 1994; Nabuzoka, 2003; Wiener & Mak, 2009; Bear et al., 2015). In the current study, it was found that SEN students have been most frequently exposed to social isolation/exclusion, followed by verbal bullying, rumor spreading, physical bullying, and attacks on property. More than half of the SEN students reported that they were not taken into the games (61.9%), they were not talked to them (59.9%), and they were not accepted to peer group (59.4%), moreover they were also subjected to verbal bullying in the form of teasing, annoying, swearing, name-calling or insulting (words such as stupid, silly or idiot, etc.). Previous studies also pointed out that students with special needs attending inclusive classrooms tend to be more exposed to social isolation/exclusion (Kavale & Forness, 1996; Llewellyn, 2000; Pavri, 2015), verbal and physical bullying (O'Moore & Hillary, 1989; Ziegler & Rosenstein-Manner, 1991; Llewellyn, 2000; Rose et al. 2011) than their typically developing peers. One of the reasons why students with special needs are more victimized than their typical peers may be related to their behavioral characteristics associated with the disability (Rose et al., 2011; Pavri, 2015). Children with disabilities have more peer-related social skills deficits and more problem behaviors than their typical peers (Kucuker & Cifci-Tekinarslan, 2015; Sucuoglu & Ozokcu, 2005); thus, they can have difficulties in developing and maintaining positive social relations (Sabornie & Beard, 1990), they receive less acceptance, more social exclusion/rejection, and are exposed to more peer bullying compared to typically developing peers (Kavale & Forness 1996; Gresham & MacMillan, 1997). Similar to the findings above, Reiter and Lapidot-Lefler (2007) reported that exposure to peer bullying among students with intellectual disabilities was correlated with emotional and interpersonal problems. Baumeister et al. (2008) also reported that thought problems, attention problems, disruptive behavior, and social problems in children with learning disabilities were positively correlated with peer victimization.

This study was also examined the relative contributions of the different types of peer victimization (*physical victimization, verbal victimization, isolation, rumor spreading, and attacks on property*) in predicting the self-esteem and loneliness in students with special needs (SEN). In the study, while all types of peer victimization under-investigation had a significant negative relationship with self-esteem of SEN students; being socially isolated /excluded (namely relational or indirect victimization) and physically bullied (namely overt or direct victimization) by their peers were found to be significant predictors of self-esteem. These findings suggest that negative experiences in peer relations (i.e. victimization experiences) may adversely affect students' opinions about themselves. Several other studies show that children/adolescents who are victimized by peer bullying tend to have lower self-esteem (Egan & Perry, 1998; Graham & Juvonen, 1998; Juvonen, Nishina, & Graham, 2000; Kapci, 2004; Piskin & Ayas, 2005). In the formation of self-concept, the role of social experiences is emphasized (Bandura, 1986; cited in Egan & Perry, 1998). While positive and supportive behaviors from important others, including peers, and self-observation of competent and effective functioning contribute to the formation of a healthy self-concept, the experience of being victimized may lead to a decrease in self-esteem over time by weakening the effects of these positive factors (Egan & Perry, 1998). Longitudinal studies suggest that children exposed to sustained peer bullying report themselves to have lower social competence and generally lower self-worth (Olweus, 1992).

Among the other main findings of this study, it was found that there were significant positive correlations between the different forms of peer victimization and loneliness, and it was also found that being socially isolated/excluded and being verbally victimized by peers were predictive of loneliness in students with special needs. Several studies in the literature showed that children who were victimized, experienced more loneliness (Boivin et al., 1995; Kochenderfer & Ladd, 1996; Graham & Juvonen, 1998; Hawker & Boulton, 2000; Juvonen et al., 2000; Pekel-Uludagli & Ucanok, 2005). In a longitudinal study, Kochenderfer-Ladd and Wardrop (2001) grouped children with respect to the timing and duration of peer victimization and examined the relationship between peer victimization and loneliness. It was found that when children moved to victim classification from non-victim group over time, their feelings of loneliness increased and their social satisfaction decreased. In the present study, being socially isolated/excluded by peers was found to be the most significant predictor of loneliness in the SEN students. It has been stated that being less accepted, more rejected, ignored or socially isolated by the peer group may lead to loneliness (Asher, Parkhurst, Hymel, & Williams, 1990; Pavri & Luftig, 2001; Bakkaloglu, 2010; Papoutsaki, Gena, & Kalyva, 2013). When compared to their typical peers, children with special needs are more exposed to social isolation / exclusion (Llewellyn, 2000; Gresham & McMillan, 1997), which may make them more vulnerable to experience loneliness (Bakkaloglu, 2010). Pavri (2015) indicated that although there has been considerable empirical evidence to support loneliness as a common result in children who are victimized from peer bullying; research findings had also indicated that children/adolescents who experience loneliness are more susceptible to persistent peer victimization than their typically developing peers.

Previous studies showed that having better social skills and forming positive relationships with others were related to receiving more peer acceptance, experiencing less social isolation/exclusion (Baydik & Bakkaloglu, 2009) and loneliness (Asher et al., 1990; Boivin, et al., 1995; Pavri & Luftig, 2001). In addition, children who have higher social competence may receive positive feedback for their social interactions from others and develop positive opinions about themselves (Sucuoglu & Cifci, 2001). It has been suggested that inclusive education can provide children with disabilities the opportunity to develop their social skills, to establish positive social relationships, and to be a part of the peer group (Odom, Buysse, & Soukakou, 2011). Several studies have shown that inclusive education leads to positive outcomes in terms of communication, social skills, and behavior for students with disabilities (see Katz & Miranda, 2002, for a review). However, a number of studies have demonstrated that students with special needs attending in inclusive classrooms had poor social skills (Sucuoglu & Ozokcu, 2005; Kucuker & Cifci-Tekinarslan, 2015) which constitute a common risk factor for increased peer rejection and victimization (Kavale & Forness 1996; Gresham & MacMillan, 1997; Llewellyn, 2000). The findings of the present study also supported that the children with special needs in inclusive classrooms were more being victimized by various forms of peer bullying than their typical peers. Additionally, it was found that the perception of being isolated/excluded by peer group was predictive of lower self-esteem and greater feelings of loneliness in these students. These findings indicate the need for anti-bullying interventions to prevent or reduce peer bullying and victimization in schools. School administrators, especially teachers have the responsibility to take measures to prevent students from being subjected to peer bullying. The implementation of individualized positive behavioral supports such as social skills training into the regular curriculum may contribute increasing peer social acceptance and prevent or reduce peer victimization (Rose et al., 2011). Teachers in inclusive classrooms should follow proactive prevention strategies for at risk students, develop awareness towards social interactions among their students with and without special needs, and create a positive social climate which promotes acceptance of individual differences. As schoolwide prevention strategies considered, school administrators should create opportunities for teacher trainings, staff trainings, and teacher-parent collaborations to prevent or reduce peer victimization (Baker & Donnelly, 2001). Programs for prevention and intervention of peer bullying/victimization should include necessary modifications for students with special needs (Raskauskas, 2010).

Although the present study contributes to the existing literature on peer victimization in students with disabilities, some limitations should be kept in mind when interpreting the findings. In related literature, it is indicated that peer victimization's relationship with self-esteem and loneliness may be bidirectional and it may be an antecedent or a consequence of low self-esteem (Egan & Perry, 1998; Lohbeck & Petermann, 2016) and high level of loneliness (Pavri, 2015). The present study provides findings about the current correlates of peer victimization with self-esteem and loneliness in students with special needs. Cross-sectional studies, as in the present study, do not allow us to identify whether peer bullying is the cause or consequence of psychosocial adjustment problems (Wolke & Lereya, 2015). Therefore, it may be expected that carefully controlled prospective studies to provide more valuable information about the long-term effects of peer victimization on psychosocial functioning of children with special needs.

The majority of students with special needs who participated in this study had learning disabilities (56.3%), mild intellectual disabilities (39.6%), and a small group (4.1%) had autism spectrum disorders. This situation limits the generalizability of the findings. Thus, this study can be repeated on more representative samples in which students with other disabilities also participate. In addition, further studies may investigate the prevalence of peer victimization and its relationship with psychosocial adjustment in students with different disability groups. Finally, assessing peer victimization only by self-report method may be regarded as another limitation of the current study. Using multiple sources of information (e.g. self, peer, teacher, or observer) may provide a more comprehensive approach to understand peer victimization in students with disabilities.

References

- Alikasifoglu, M., Erginöz, E., Ercan, O., Uysal, O., & Kaymak-Albayrak, D. (2007). Bullying behaviours and psychosocial health: results from a cross-sectional survey among high school students in Istanbul, Turkey. *European Journal of Pediatrics*, *166*, 1253-1260.
- Asher, S. R., Hymel, S., & Renshaw, P. D. (1984). Loneliness in children. *Child Development*, *55*, 1456-1464.
- Asher, S. R., & Wheeler, V. A. (1985). Children's loneliness: A comparison of rejected and neglected peer status. *Journal of Consulting and Clinical Psychology*, *53*, 500-505.
- Asher, S. R., Parkhurst, J. T., Hymel, S., & Williams, G. A. (1990). Peer rejection and loneliness in childhood. In S. R. Asher, J. D. Cole (Eds.), *Peer rejection in childhood* (pp. 253- 273). New York, NY: Cambridge University Press.

- Aydın-Gorucu, R. (2016). *Dikkat eksikliği ve hiperaktivite bozukluğu olan çocuk ve ergenlerin siber zorbalık ve mağduriyeti ile ilişkili etmenlerin araştırılması*. Yayınlanmamış tıpta uzmanlık tezi, Ankara: Ankara Üniversitesi.
- Baumeister, A. L., Storch, E. A., & Geffken, G. R. (2008). Peer victimization in children with learning disabilities. *Child and Adolescent Social Work Journal*, 25(1), 11-23.
- Baydik, B., & Bakkaloglu, H. (2009). Predictors of sociometric status for low socioeconomic status elementary mainstreamed students with and without special needs. *Educational Sciences: Theory & Practice*, 9, 401-447.
- Baker, K., & Donnelly, M. (2001). The social experiences of children with disability and the influence of environment: A framework for intervention. *Disability & Society*, 16(1), 71-85.
- Bakkaloglu, H. (2010). A comparison of the loneliness levels of mainstreamed primary students according to their sociometric status. *Procedia-Social and Behavioral Sciences*, 2, 330-336.
- Bear, G.G., Mantz, L.S., Glutting, J.J., Yang, C., & Boyer, D.E. (2015). Differences in bullying victimization between students with and without disabilities. *School Psychology Review*, 44(1), 98-16.
- Boivin, M., Hymel, S., & Bukowski, W. M. (1995). The roles of social withdrawal, peer rejection, and victimization by peers in predicting loneliness and depressed mood in childhood. *Development & Psychopathology*, 7, 765-785.
- Card, N.A., & Hodges, E.V. (2008). Peer victimization among school children: Correlations, causes, consequences, and considerations in assessment and intervention. *School Psychology Quarterly*, 23, 451-461.
- Cassidy, J., & Asher, S. (1992). Loneliness and peer relations in young children. *Child Development*, 63, 350-365.
- Cifci-Tekinarslan, I., & Kucuker, S. (2015). Examination of the psychometric properties of the children's loneliness scale for students with and without special needs in inclusive classrooms. *Educational Sciences: Theory and Practice*, 15, 709-721.
- Coopersmith, S. (1991). *Self-esteem inventories*. Palo Alto: Consulting Psychologist Press, Inc.
- Craig, W. M., Peters, R. D., & Konarski, R. (1998). Bullying and victimization among Canadian school children. *Applied Research Branch Strategic Policy Human Resources Development*. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.489.6922&rep=rep1&type=pdf>
- Crick, N.R., & Ladd, G.W. (1993). Children's perceptions of their peer experiences: Attributions, loneliness, social anxiety, and social avoidance. *Developmental Psychology*, 29, 244-254.
- Çınkır, Ş., & Karaman-Kepeneci, Y. (2003). Öğrenciler arası zorbalık. *Kuram ve Uygulamada Eğitim Yönetimi*, 34, 236-253.
- Çınkır, Ş., & Karaman-Kepeneci, Y. (2006). Bullying among Turkish high school students. *Child Abuse and Neglect*, 30, 193-204.
- Cokluk, O. S., Sekercioglu, G., & Buyukozturk, S. (2012). *Sosyal bilimler için çok değişkenli istatistik: Spss ve lisrel uygulamaları*. Ankara: Pegem Akademi Yayıncılık.
- Dake, J.A., Price, J. H., & Telljohann, J. K. (2003). The nature and extent of bullying at school. *Journal of School Health*, 73(5), 173-181.
- Egan, S.K., & Perry, D.G. (1998). Does low self-regard invite victimization? *Developmental Psychology*, 34, 299-309.
- Fleming, L.C., & Jacobsen, K.H. (2009). Bullying and symptoms of depression in Chilean middle school students. *School Health*, 79(3), 130-137.
- Galanaki, E., P., & Kalantzi-Azizi, A. (1999). Loneliness and social dissatisfaction: Its relation with children's self-efficacy for peer interaction. *Child Study Journal*, 29(1), 1-21.
- Graham, S., & Juvonen, J. (1998). Self-blame and peer victimization in middle school: an attributional analysis. *Developmental Psychology*, 34, 587-599.
- Gresham, F. M., & McMillan, D. L. (1997). Social competence and affective characteristics of students with mild disabilities. *Review of Educational Research*, 67, 377-415.
- Gucray, S. (1989) *Çocuk yuvasında ve ailelerinin yanında kalan 9-10-11 yaşlarındaki çocukların benlik saygısını etkileyen bazı faktörler*. Yayınlanmamış doktora tezi, Ankara: Hacettepe Üniversitesi.
- Gultekin, Z. (2003). *Akran zorbalığı belirleme ölçeği geliştirme çalışması*. Yayınlanmamış yüksek lisans tezi, Ankara: Hacettepe Üniversitesi.
- Hawker, D., & Boulton, M. (2000). Twenty years' research on peer victimization and psychosocial maladjustment: A meta-analytic review of cross-sectional studies. *Journal of Child Psychology and Psychiatry*, 41, 441-455.
- Holmberg, K., & Hjern, A. (2008). Bullying and attention deficit-hyperactivity disorder in 10 year olds in a Swedish community. *Developmental Medicine & Child Neurology*. 50(2), 134-138.
- Hong, J.S., & Espelage, D.L. (2012). A review of research on bullying and peer victimization in school: An ecological system analysis. *Aggression and Violent Behavior*, 17, 311-322.

- Hugh-Jones, S. & Smith, P.K. (1999). Self-reports of short-and long-term effects of bullying on children who stammer. *British Journal of Educational Psychology*, 69, 141-158.
- Juvonen, J., Graham, S., & Schuster, M. A. (2003). Bullying among young adolescents: the strong, the weak, and the troubled, *Pediatrics*, 112, 1231-1237.
- Juvonen, J., Nishina, A., & Graham, S. (2000). Peer harassment, psychological adjustment, and school functioning in early adolescence. *Journal of Educational Psychology*, 92, 349–359.
- Kapci, E. G. (2004). İlköğretim öğrencilerinin zorbalığa maruz kalma türünün ve sıklığının depresyon, kaygı ve benlik saygısıyla ilişkisi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Dergisi*, 37(1), 1-13.
- Katz, J., & Mirenda, P. (2002). Including students with developmental disabilities in general education classrooms: Social benefits. *International Journal of Special Education*, 17(2), 26-36.
- Kaukiainen, A., Salmivalli, C., Lagerspetz, K., Tamminen, M., Vauras, M., & Maki, H. (2002). Learning difficulties, social intelligence, and self-concept: connections to bully-victim problems. *Scandinavian Journal of Psychology*, 43, 269-278.
- Kavale, K. A., & Forness, S. R. (1996). Social skill deficits and learning disabilities: A meta-analysis. *Journal of Learning Disabilities*, 29, 226-257.
- Kaya, A. (2005). Çocuklar için yalnızlık ölçeği'nin Türkçe formu'nun geçerlik ve güvenilirlik çalışması. *Eurasian Journal of Educational Research*, 19, 220-237.
- Knox, E. & Conti-Ramsden, G. (2003). Bullying risks of 11-year-old children with specific language impairment (SLI): does school placement matter? *International Journal of Language and Communication Disorders*, 38(1), 1-12.
- Kubiszewski, V., Fontaine, R., Potard, C., & Gimenes, G. (2014). Bullying, sleep/wake patterns and subjective sleep disorders: Findings from a cross-sectional survey. *Chronobiology International*, 31, 542-553.
- Kochenderfer, B. J., & Ladd, G. W. (1996). Peer victimization: Cause or consequence of school maladjustment? *Child Development*, 67, 1305–1317.
- Kochenderfer-Ladd, B., & Wardrop, J.L. (2001). Chronicity and instability of children's peer victimization experiences as predictors of loneliness and social satisfaction trajectories. *Child Development*, 72(1), 134-151.
- Kucuker, S., & Tekinarslan, I. C. (2015). Comparison of the self-concepts, social skills, problem behaviors, and loneliness levels of students with special needs in inclusive classrooms. *Educational Sciences: Theory and Practice*, 15, 1559-1573.
- Llewellyn, A. (2000). Perceptions of mainstreaming: A systems approach. *Developmental Medicine and Child Neurology*, 42, 106–115.
- Lohbeck, A., & Petermann, F. (2016). Peer victimization, self-concept, and grades: the mediating role of self-concept. *Deviant Behavior*, <http://dx.doi.org/10.1080/01639625.2016.1197654>
- Luciano, S., & Savage, R. S. (2007). Bullying risk in children with learning difficulties in inclusive educational settings. *Canadian Journal of School Psychology*, 22, 14-31.
- Miller-Graff, L.E., Cater, A.K., Howell, K.H., & Graham-Bermann, S.A. (2015). Parent-child warmth as a potential mediator of childhood exposure to intimate partner violence and positive adulthood functioning. *Anxiety, Stress, and Coping*, 29, 259-273.
- Moore, S. E., Norman, R. E., Suetani, S., Thomas, H. J., Sly, P. D., & Scott, J. G. (2017). Consequences of bullying victimization in childhood and adolescence: A systematic review and meta-analysis. *World Journal of Psychiatry*, 7(1), 60-76.
- Mynard, H., & Joseph, S. (2000). Development of the multidimensional peer victimization scale. *Aggressive Behavior*, 26, 169-178.
- Nabuzoka, D. (2003). Experiences of bullying-related behaviours by English and Zambian pupils: A comparative study. *Educational Research*, 45, 95-104.
- Odom, S.L., Buisse, V., & Soukakou, E. (2011). Inclusion for young children with disabilities: A quarter century of research perspectives. *Journal of Early Intervention*. 23 (4), 344-356.
- Olweus, D. (1992). Victimization by peers: Antecedents and long-term outcomes. In K. H. Rubin & J. B. Asendorpf (Eds.), *Social withdrawal, inhibition, and shyness in childhood* (pp. 315-341). Hillsdale, NJ: Erlbaum.
- Olweus, D. (1993). *Bullying at school: What we know and what we can do*. Malden, MA: Blackwell Publishing.
- Olweus, D. (1997). Bully/victim problems in school: Facts and intervention. *European Journal of Psychology of Education*, 12, 495-510.
- O'Moore, A.M. & Hillary, B. (1989). Bullying in Dublin schools. *Irish Journal of Psychology*, 10(3), 426–441.
- Orengul, A. C. (2013). *Dikkat eksikliği hiperaktivite bozukluğu tanısıyla izlenmekte olan çocuklarda akran örselemesi/zorbalık*. Yayınlanmamış tıpta uzmanlık tezi, İstanbul: Marmara Üniversitesi.
- Papoutsaki, K., Gena, G., & Kalyva, E. (2013). How do children with mild intellectual disabilities perceive loneliness? *Europe's Journal of Psychology*, 9(1), 1-7.

- Pavri, S., & Luftig, R. (2001). The social face of inclusive education: Are students with learning disabilities really included in the classroom? *Preventing School Failure, 45*, 8–14.
- Pavri, S. (2015). Loneliness: The cause or consequence of peer victimization in children and youth. *The Open Psychology Journal, 8*, 78-84.
- Pekel-Uludagli, N., & Ucanok, Z. (2005). Akran zorbalığı gruplarında yalnızlık ve akademik başarı ile sosyometrik statüye göre zorba/kurban davranışı türleri. *Türk Psikoloji Dergisi, 20(56)*, 77-92.
- Pellegrini, A.D. (2002). Bullying, victimization, and sexual harassment during the transition to middle school. *Educational Psychologist, 37*, 151-163.
- Piskin, M. (1996). *Self-Esteem and locus of control of secondary school children both in England and Turkey*. Unpublished dissertation thesis, Leicester: University of Leicester.
- Piskin, M. (2003). *Okullarda yaygın bir sorun: akran zorbalığı*. VII. Ulusal Psikolojik Danışma ve Rehberlik Kongresi. Malatya: İnönü Üniversitesi.
- Piskin, M., & Ayas T. (2005). *Zorba ve kurban öğrencilerin utangaçlık, içedönüklük, dışa dönüklük ve öz saygı değişkenleri bakımından İncelenmesi*. VIII. Ulusal Psikolojik Danışma ve Rehberlik Kongresi. İstanbul: Marmara Üniversitesi.
- Piskin, M. & Ayas, T. (2011). Akran zorbalığı ölçeği: Çocuk formu. *Akademik Bakış Dergisi, 23*, 1-12.
- Raskauskas, J. (2010). Multiple peer victimization among elementary school students: Relations with social-emotional problems. *Social Psychology of Education, 13*, 523-539.
- Reiss, A., & Roth, J.A. (Ed.) (1993). *Understanding and preventing violence*. Washington, DC: National Academy Press.
- Reiter, S., & Lapidot-Lefler, N. (2007). Bullying among special education students with intellectual disabilities: Differences in social adjustment and social skills. *Intellectual and Developmental Disabilities, 3*, 174-181.
- Rose, C. A., Monda-Amaya, L. E., & Espelage, D. L. (2011). Bullying perpetration and victimization in special education: A review of the literature. *Remedial and Special Education, 32(2)*, 114-130.
- Sabornie, E. J. (1994). Social-affective characteristics in early adolescents identified as learning disabled and nondisabled. *Learning Disability Quarterly, 17*, 268–279.
- Sabornie, E. J., & Beard, G. H. (1990). Teaching social skills to students with mild handicaps. *Teaching Exceptional Children, 23(1)*, 35-38.
- Salmivalli, C. (2010). Bullying and the peer group: A review. *Aggression and Violent Behavior, 15(2)*, 112-120.
- Salmon, G., James, A., Cassidy, E. L., & Javaloyes, M. A. (2000). Bullying a review: presentations to an adolescent psychiatric service and within a school for emotionally and behaviorally disturbed children. *Clinical Child Psychology and Psychiatry, 5*, 563-579.
- Sentenac, M, Arnaud, C., Gavin, A., Molcho, M., Gabhainn, S.N., & Godeau, E. (2012). Peer victimization among school-aged children with chronic conditions. *Epidemiologic Reviews, 34*, 120-128.
- Singer, E. (2005). The strategies adopted by Dutch children with dyslexia to maintain their self-esteem when teased at school. *Journal of Learning Disabilities, 38*, 411-423.
- Snyder, M. (2005). What parents can do about childhood bullying. <http://www.schwablearning.org/articles.asp?r>
- Storch, E. A., & Masia-Warner, C. L. (2004). The relationship of peer victimization to social anxiety and loneliness in adolescent females. *Journal of Adolescence, 27*, 351–362.
- Sucuoglu, B., & Cifci, I. (2001). *Yapamıyor mu? Yapmıyor mu? Zihin engelli çocuklar için sosyal beceri öğretimi* [Can't or won't? Teaching social skills for children with intellectual disabilities]. Ankara, Turkey: Ankara Üniversitesi Basımevi.
- Sucuoglu, B., & Ozokcu, O. (2005). *Kaynaştırma öğrencilerinin sosyal becerilerinin değerlendirilmesi* [Examination of the social skills of inclusion students]. Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi, 6(1), 41–58.
- Underwood, M. K. (2003). *Social Aggression Among Girls*. New York: Guilford.
- Unnever, J.D., & Cornell, D.G. (2003). Bullying, self-control, and ADHD. *Journal of Interpersonal Violence, 18(2)*, 129-147.
- Whitney, I., Smith, P.K., & Thompson, D. (1994). Bullying and children with special educational needs. In P. K. Smith ve S. Sharp (Eds.), *School Bullying: Insights and Perspectives* (pp.213-240). London: Routledge.
- Wiener, J., & Mak, M. (2009). Peer victimization in children with attention-deficit/hyperactivity disorder. *Psychology in the Schools, 46*, 116-131.
- Wolke, D., & Lereya, S. T. (2015). Long-term effects of bullying. *Archives of Disease in Childhood, 100*, 879-885.
- Yurtal, F., & Cenkseven, F. (2006). *İlköğretim okullarında zorbalığın incelenmesi*. 1. Şiddet ve Okul: Okul ve Çevresinde Çocuğa Yönelik Şiddet ve Alınabilecek Tedbirler Sempozyumu, İstanbul.
- Ziegler, S., & Rosenstein-Manner, M. (1991). *Bullying at School: Toronto in an International Context*. Research Services No. 196.

Performance Management In Higher Education: A Reflexive Approach To Heads Of Department's As Accountable For Academics' Performance

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Abstract

Performance management in higher education has been critiqued for enabling the encroachment of neoliberalism in public institutions, producing high performance expectations and surveillance practices that subjugate academics and managers. Caught up in the romanticism of leadership as a “solution to all ills” and hoping to mediate undesirable effects on performance management, I was moved to explore a different and appropriate academic HODs’ leadership for performance management. However, following a reflexive breakdown, seeing the blind spot in my study’s assumption that critical leadership is necessary to change academics’ performance conditions, I questioned the rationality of seeking it when HODs are barely doing the leading. This suggests the possibility of seeking alternative modes of organising (management, power, autonomy, peer influencing) that HODs are using or could undertake in universities within the confines of their contextually embedded roles.

Keywords: *Critical leadership, reflexive leadership, performance management, heads of department*

Introduction

Following the growing and rationalised encroachment of neoliberalism in higher education (HE), accountability mechanisms such as quality assurance and performance management (PM) are gaining ground. These mechanisms are necessary tools to foster a performative culture that responds to globalisation, national mandates, competition, diminishing resources and technological advances (Johnson, 2002). However, observations and literature point to PM as a problematic process that is rather a surveillance tool, policing academics as well as threatening education quality (Clarke & Knights, 2015). At the same time, the monetary rewards related to performance excellence are “not worth the sweat” (Seyama & Smith, 2015). In its attempt to enable alignment of institutional performance goals, PM effects a disciplinary power, subjugating HE managers and academics (Ball, 2015).

Scholars have raised strong objections against the seeming compliance and complicitness of academics in their own subjugation (Alvesson & Spicer, 2016; Ball, 2015; Clarke & Knights, 2015). Despite the risk of subjugated academics failing to fulfil their role of conscientising students and facilitating their growth as critical active citizens, there is evidence that academics do not resist repressive and subjugating PM practices.

As middle managers, academic heads of department (HODs, directors, chairpersons) are central to the implementation of PM in universities. Positioned as custodians of institutional vision and strategic goals, their role is to ensure that senior management’s (deans) performance targets filter down the hierarchy. However, as important as their HOD’s role is, it is difficult and ambiguous. They are confronted with divergent expectations from senior management and academics respectively (Cilliers & Pienaar, 2014). On the one-hand, senior management demands specific and higher performance targets and on the other hand, academics want HODs to create an amenable environment for them to achieve academic success and to protect them against unrealistic performance demands (Seyama & Smith, 2016).

In the light of HE’s increasing challenges and HODs’ changing roles, university senior managers and leadership scholars are explicit about the need for HODs to be leaders that transcend traditional managerial and administrative roles (Jones, 2011). Taylor and Machado (2006) observe that, “the complementary roles of leaders and managers with necessary planning expertise may provide the most productive higher education environment for advancement and progress” (p. 139).

Against this background, I was seduced by the idea of leadership as a “solution to all ills” (Meindl, 1995) and I embarked on a journey to explore a different and more appropriate leadership for PM, namely, critical leadership. I undertook a critical socio-constructionist case study with 25 HODs and academics to examine how SA universities’ academic HODs lead staff PM and why their leadership has come to take the form it has. In view of mainstream leadership studies’ neglect of leadership power dynamics in organisations (Collinson, 2011), critical leadership seemed a relevant approach to deconstruct power asymmetries dominating PM relations in universities. However, following a reflexive breakdown where I saw the blind spot in my study’s assumption that critical leadership is necessary to change academics’ repressive performance conditions, I had to regroup and dig deeper into my thinking about leadership.

With most HODs and academics reporting that HODs do not engage in leadership, I questioned the rationality of arguing for critical leadership when HODs are barely doing any leading.

Alvesson, Blom and Sveningsson's (2016) contend that amidst much talk and research about leadership, the act of leading tends to disappear in the organisational performance milieu. I argue in this paper that it is fallacious and limiting to focus only on leadership even if it is an important aspect of an organisation. This involved identifying alternative modes of organising that HODs use or can use within the confines of their contextually embedded roles. Hopefully, such modes can transform the current neoliberal performative context in universities and result in a non-subjecting PM.

I present critical meanings of leadership and the empirical evidence, both of which caution us against focusing only on HODs' leadership to address the problematic of PM in order to create less repressive working conditions for academics. Thus, in this paper, I analyse the dichotomous role of HODs and offer meanings of critical leadership and reflexive leadership approaches. I then present participants' views on HODs' leadership in the light of my re-interpretation of my data that offers a 'fresher' and more cautious perspective. Finally, I conclude with the meanings of leadership within academic institutions, followed by implications of my study for future research.

Context

I admit that I am guilty as charged for succumbing to the romanticism of leadership (Meindl, Ehrlich & Dukerich, 1985) when thinking of a possible solution to PM challenges in universities. Alvesson and Spicer (2014) clarify the reason for such a trap:

In many instances, embracing the idea of leadership does not involve any significant change to practice but merely indicates an interest in relabeling managerial work as "leadership" to make it sound more fashionable and impressive. The term *leadership* is seductive, has a strong rhetorical appeal, and is therefore heavily overused. (p. 40)

Learmonth and Morrell (2017) are also troubled by critical leadership scholars' display of leadership romanticism in their "*a priori*" use of the terms leadership or leader-follower dualism instead of management or manager-worker to refer to hierarchical distinctions in organisations. They argue that this threatens to weaken critical leadership studies' (CLS) position in confronting hegemonic power relations in organisations. Alvesson et al. (2016) also contend that the dominance of leadership discourse entangles researchers in a pigeon paradigm mode; consequently:

Nuances involved in the efforts to revise "leadership" are easily lost as the major framing reinforces an understanding that the alternatives to leadership is leadership, not peer relations, professionalism, autonomy, co-workership, organizing processes, or mutual adjustment offering alternative framings and understanding than what the leadership vocabulary invites. (p. 265)

As PM is a fairly 'new' practice in SA universities, the overwhelming empirical evidence that alludes to implementation complexities (Ngcamu, 2013; Seyama, 2013; Seyama & Smith, 2015) meant that I needed to be creative in the way I searched for a 'solution'. It was important that such a solution be sufficiently persuasive to get a buy-in from 'powerful' university stakeholders. Hence, perhaps, my ideological commitment to leadership. Following my earlier study, where academics argued strongly about HODs' lack of positional authority and competence to effect meaningful PM, I embarked on critical socio-constructivism study in search of critical leadership. I deduced that the first point of departure in conceptualising an emancipatory leadership of PM is an understanding of how power constitutes academic neoliberal subjectivities and its ramifications for academic activities. This would then provide the basis for academics and HODs to construct critical leadership perspectives of PM as an emancipatory project.

Early in my study, having interviewed almost half of the selected participants, I observed the seeming absence of critical leadership perspectives among HODs in their engagement with PM in their university. However, I understood this merely to be a limitation of critical leadership perspectives due to the academics being ready followers and willing to comply. And that HODs were still caught up in mainstream leadership thinking or post heroic leadership. These HODs did not provide the rich empirical material on possible critical leadership perspectives that I was probing and that some activist HODs were surely enacting. I even wrote a conference paper focusing on PM as a panoptic and governmentality practice, that subjugates academic and HODs' agency and that creates intellectually repressive conditions in educational spaces. In my discussion and conclusion I lamented HODs absent critical leadership perspectives. At one conference presentation, the renowned Professor Phillip Hallinger asked me if I knew why there

was no critical leadership. I did not know what to say. In fact, I was confused. I thought I had missed an important step in my study. However, he pointed out that it was because HODs, and academics in general, do not have the courage to do it or are afraid of reprisals for critiquing the system or going against the grain.

I continued with my study as planned. I recruited participant academics and HODs who are perceived to be activists, critical of neoliberal inflections in their university. Of course, they were in the minority. Since my assumptions for my study were founded on academics and HODs subjugation, I justified the absence of critical perspectives as an absence of critical leadership, which ideally should mediate against untenable performance conditions. The question then is, had I not initially searched for leadership, would I have understood my data differently and understood why both academics and HODs were evidently hesitant to refer to HODs' roles as those of leadership? Would I have recognised that I had boxed myself into 'leadership' spaces where the probability is very high that there are no answers or the answers are band-aid solutions?

Role Of Academic Heads Of Department

By its very nature, the department chairship is a series of interruptions and interactions with many people at multiple levels of the institution. (Wolverton, Ackerman & Holt, 2005, p. 229)

Wolverton et al. (2005) point out that an HODs' role is multifaceted, requires incumbents to interact with people at all levels in a university and is characterised by unclear and conflicting expectations of managerial vs. leadership roles (Cilliers & Pienaar, 2014). This plethora of roles means that the place of middle managers in HE is murky, resulting in it being difficult for HODs to fulfill the expectations of their role (Clegg & McAuley, 2005). While HODs as middle managers in universities are vital to the function of a university, their position is still vague (Nguyen, 2013). Essentially, academic middle managers are perceived to be intermediaries between senior managers and academics. They are expected to communicate university decisions to the personnel below them and at the same time ease tensions that could emanate from those decisions (Gleeson & Shain, 1999).

It is difficult to provide a comprehensive list of HODs' roles, duties and accountabilities (Nguyen, 2013), particularly with the growing calls for HODs to fulfil the leadership role necessitated by the current difficult context of HE. HODs are now required to employ managerial leadership, which is a "leadership exercised by people holding a managerial (appointed or elected, but formally superior) position, targeting formal subordinates" (Blom & Alvesson, 2014, p. 1). For instance, Rowley (1997) argues that HODs' leadership of academic work primarily involves managing the achievement of institutional strategic goals, thrusts and targets in the realm of teaching, research and community service, as these are regarded as the key pillars of HE. HODs have to "combine routine maintenance, long-term planning and performance review with encouragement for department growth, development and collaboration" (Middlehurst, 1993, p. 134). Consequently, their roles are diverse and determined mainly by their institutional contexts, especially how their universities respond to national and global forces as informed by the omnipresent neoliberal ideology (Johnson, 2002). To clarify the complex and dual nature of HODs' roles, Prichard (2000) distinguishes between two types of 'knowledge', namely, management and professional knowledge, which underpin HODs' roles:

Management knowledge - seeks to constitute the department as strategically focused, customer orientated, excellent in teaching and research and effectively managed. 'Professional Knowledge' – seeks to constitute departments as student-centred, teaching and/or research focused, collegially organised and possibly politically active. (p. 28-29)

This conceptualisation demonstrates the tenuous position of HODs in steering their departments. These knowledges can be seen as the essence of the role conflicts that HODs experience. An HOD's role is also determined by how individual HODs conceive of themselves in terms of their, "specific research groups, their sub-disciplines, or their area of professional expertise, which influences the roles they emphasise for themselves" (Bolden, Gosling, O'Brien, Peters, Ryan & Haslam, 2012, p. 5). Knight and Trowler (2001) posit that the following six aspects within a 'given framework' constructed by a university determine HODs' engagement with their positional roles:

Firstly, the nature of the activity as defined by the participants; secondly, the community of practice in which they operate; thirdly, the identity of the individual which is likely to be multiple, dynamic and situational contingent; fourthly, the meaning attributed to the role; fifthly, the discourse in which they operate; and finally, the technology available which will affect practice. (p. 49)

Nguyen (2013) observes that:

The Western-focused studies found six generic groups of duties of middle-level academic managers. These broad categories of tasks are department governance (mission, goals, policies, climate), programme management (tuition, research, service), human resource management, budget and resources, external communication and office management (supervision). (p. 2)

While the above responsibilities show that an HODs' role encompasses both management and leadership, the administrative role takes priority. HODs are accountable for operations, policy implementation and quality, and by default become burdened with administration (London, 2011). Research has shown that most HODs spend more than 50% of their time tackling ever-increasing administrative tasks (Nguyen, 2013); their leadership role is increasingly minimised (London, 2011; Murphy & Curtis, 2013). Having to juggle academic and management responsibilities makes an HOD's role particularly complex.

In this study, I recognise the duality of HODs' managerial and leadership roles but, most importantly, I acknowledge the inevitable call for HODs' leadership. However, leadership is a fundamentally contested notion (Grint, 2005). Varied opinions have been put forth about the meaning of leadership in HE, especially as HODs have not traditionally been regarded as leaders. As "reference to leadership inevitably raises the specter of the managerial role of HODs" (Jones, 2011, p. 280), academic dialogue and literature on HODs' leadership positions have become robust, provoking questions on what these leadership positions are or what they ought to be. Collinson's (2014) position on dialectical thinking could point us in the right direction when researching the role of HODs, as the above dichotomisation in roles overlooks the difficult leadership dynamics and their interconnectedness with management.

Critical Leadership: A Reflexive Approach

Critical leadership offers alternative leadership perspectives that aim to critically examine the normalised leadership power asymmetries in organisations. As a move from mainstream leadership studies (MLS), "critical leadership studies (CLS) explicitly recognize that, for good and/or ill, leaders and leadership dynamics (defined here as the shifting, asymmetrical interrelations between leaders, followers and contexts) also exercise significant power and influence over contemporary organizational and societal processes" (Collinson, 2011, p. 181). Critical leadership disentangles leadership's understanding or meaning from concise, constant and objective definitions or descriptions to a more adaptable social organisational practice that is given meaning by those experiencing it, within a particular setting and under specific circumstances. Critical leadership focuses on non leader-centric notions of leadership, acknowledging follower agency and its influence on enabling or disabling leadership (Collinson, 2011). CLS critiques the romanticism of leadership, which gives it cult-like status as the only mode of organising that can solve all organisational problems (Meindl et al., 1985). It cautions one against the liberal and popular use of leadership at the expense of management (Collinson, 2014). According to Alvesson et al. (2016):

Sometimes leadership may be central, but so might management, the use of power and less hierarchical modes of organizing, including people being supported by teams, autonomy and professional networks rather than a leader. All this may be indirectly influenced by leadership that is, for example, focused on developing teams or encouraging people to use a broad set of contacts, but various modes of organizing often grow organically and are influenced by cultures, groups and individuals other than leaders. (p. 4)

A reflexive leadership approach within CLS reveals the shortcomings of leader-centric notions of leadership. In addition, reflexivity furthers these studies' objective by seeking to offer extant alternative organisational practices that also contribute to organisational performance. Alvesson and Kärreman (2016) suggest these as "peer relations, professionalism, autonomy, co-workership, organizing processes, or mutual adjustment" (p. 142). Guiding my re-thinking in seeking a solution for problematic and unfeasible PM practices in leadership is Alvesson and Kärreman's (2013) conception of reflexivity as "being about challenging different perspectives and vocabularies and avoiding being caught in a specific view or way of understanding phenomena, but seeing shortcomings and being open for alternatives" (p. 35). I am moving away from the tendency to accept unquestioningly theoretical assumptions founded on specific empirical contexts. In order to present my argument for a reflexive approach to leadership to interrogate PM in HE, I subscribe to Meindl et al.'s (1985) notion that "leadership is in the eye of the beholder" (p. 79). I critically examine leadership meanings, within their context of those being led. I therefore interrogate how academics as positional subordinates with the possibility of 'receiving' HODs' leadership construct and examine such leadership. From this perspective, we might gain an insight on their 'demand' for leadership (Blom & Alvesson, 2014). Opening

up HODs' leadership as a demanded leadership, positions academics as fundamental to granting or legitimising HODs' leadership, if they receive it (DeRue & Ashford, 2010). At the same time, academics can deligitimise HODs' leadership if they reject it (DeRue & Ashford, 2010). In this sense, leaders and followers engage in a leadership relationship out of their own volition as opposed to a managerial relationship where positional authority compels subordinates' compliance (Blom & Alvesson, 2018).

I am re-looking at my empirical material, which reveals academics and HODs' hesitation to refer to HODs' leadership, or their lack of capacity to lead because of the university's constraining environment. Yet, SU is reported to be one of the top performing universities' in SA. Academics are still performing despite the absence of HODs' influence, direction or guidance, which are typical of leadership. Arguably, in this setting, HODs leadership could be inconsequential. Therefore, I am re-reading my data to remove my blinkers and to see that leadership is not central to performance. Rather, I am searching for what *is* stimulating academics' performance.

In my study, I assumed that leadership is present in academic-HODs' dynamic even if it is minimal. The focus of my study's data interpretation was on how academics perceive HODs', as their line managers, leadership. Reflecting on this assumption in the light of my data, that is, absent HOD leadership, was fundamental to my assumption's breaking down. By adopting a reflexive approach, I have shifted from the conventional understanding of leadership that largely perceives it to be an all-encompassing organisational practice that is pivotal to all aspects of organisational functioning and success (Alvesson et al., 2016). This understanding that leadership always serves the best interests of the organisation, attributes such a powerful position to leadership that all other organisational practices are relegated to the background, if acknowledged at all (Alvesson et al., 2016). As a consequence:

...managers think that they need to exercise leadership and that a solution to many/most organizational problems is more/better/ different leadership. For formal subordinates, the reinforcement of leadership ideology may result in a lack of autonomy and initiative since leadership is supposed to be the source of visions, values, inspiration and meaning at work. (Blom & Alvesson, 2015, p. 486)

With leadership as the primary focus of analysis, opportunities to deepen our understanding of how organisations and people work outside of leadership, are lost. As noted above, this thinking creates conditions that enables leaders to uphold unequal power relations, thereby subjugating followers. As Wilson (2014) points out, "leadership has been repeatedly constructed as the necessary and appropriate response to the 'problem' of the follower, thereby contributing to the continuing prevalence of a leader-centric understanding of leadership" (p. 1). I take the position that leadership is more than a social construction or communicative process. I acknowledge the importance of authorising or granting the leader-follower dynamic in leadership, as espoused by Alvesson and Blom (2015) who state that "leadership is not follower-free, and followership seldom means blind obedience" (p. 272). Accordingly, leadership is also contingent upon followers' demand for it.

I am re-interpreting my data as I explore academics' views of HODs' role from a leadership perspective, that is, "understanding how managers become leaders in the eyes of their followers" (Chiu, Balkundi & Weinberg, 2017, p. 335). In keeping with social constructionists' position, leadership is not only the domain of positional managers, but also that of subordinates. Therefore, leadership is flexible. It emerges within the continuum of leader and followers, where there is "mutual influencing or switched roles over time" (Blom & Alvesson, 2015, p. 487). Also, depending on the situation, leaders lead from behind and followers follow from the front (Moore, 2012).

As leadership is relational (DeRue & Ashford, 2010), it is important to consider that "the nature of leader-follower relationships (either positive or negative) could affect how followers judge their manager thus influence their leadership perceptions" (Chiu et al., 2017, p. 335). A leadership relationship between managers and subordinates is perceived to benefit both parties in that "managers are more likely to have positive evaluations, build constructive relationships with followers, and access more resources, all of which benefit manager performance" (Lord & Maher, 1990 cited in Chiu et al., 2017, p. 336). Described as an influencing organisational mode or practice, leadership is therefore not dependent on the power of formal authority as is the case in the relationship between managers and subordinates (Blom & Alvesson, 2014).

In making leadership the focus of my study, I believe that I ended up being blind to, ignoring or disregarding other aspects of organisational work life that are already bubbling beneath the surface and that could inform one about what

makes the university successful in the dichotomous, autonomous-collegial and managerial-autocratic terrains. As Blom and Alvesson (2015) suggest:

Also ‘horizontal’ modes of organizing – peer influencing, teamwork and autonomy – may to some extent be an outcome of or dependent on leadership support (and thereby less horizontal). But even if leadership sometimes can be important for, and overlap, other modes of organizing, this does not motivate that leadership as a term is invoked so broadly so that it covers more or less all forms of organizing. (p. 488)

Methodology

I conducted the research using a qualitative case study method premised on a critical socio-constructionist paradigm (Hosking, 2008). The study focused on understanding participants’ attribution of meaning to the leadership of PM and, importantly, how their contexts influenced its implementation and impact on stakeholders. Data were collected from personal interviews with HODs and academics. The centrality of power dynamics in the process was interrogated. Participants responded to questions about their experience of PM at SU. Twenty-five 45-60 minutes interviews were conducted. With the participants’ approval, each interview was audio-recorded. All the interviews were transcribed verbatim. To ensure anonymity of participants, pseudonyms were used to represent participants’ voices.

My analysis of data followed an “exploratory analysis [which] is the classic content-driven, inductive approach that most people associate with qualitative research” (Guest, MacQueen & Namey, 2012, p. 49). Following an iterative process, I first coded and categorised my data. This included recognising, analysing and reporting patterns within the data (Saldaña, 2009). The content was then critically interpreted and reflected upon in relation to ideology, power and social reproduction using critical performativity tactics of affirmative care, progressive pragmatism and presenting potentialities (Alvesson & Spicer, 2012). This resulted in critical accounts of the HODs’ role in academics’ PM that uncovered the research participants’ attribution of meaning to leadership.

Findings

Heads Of Departments’ Leadership In The Eyes Of The Beholders (Academics)

While the aim of this study was to offer a critical reading of PM practices at a university in order to reveal extant critical leadership perspectives, dialogue with participants exposed a reluctant leader-follower dynamic between HODs and academics. Academics do not fit into the conventional conception of followers as willing and ready to be led. Empirical studies also suggest that leadership does not always exist within HOD-academics relations. Positioning academics’ perspectives outside leader-centric notions of leadership, the findings offer a critical reading of HODs’ managerial leadership at SU that suggests a fragile existence of leader-follower relations. Alternatively, if one takes Learmonth and Morrell’s (2017) caution against overuse of the term leadership, the HOD-academic relations are more manager-worker relations, which infers non-influential relations. Participants expressed a persistent view that points to a neoliberal managerialist approach in HE that result in HODs operating under some executive deans’ autocratic and instructive leadership. This compromises HODs’ influence and power standing perceptions among their subordinates. For this reason, academics are disinclined to accept HODs’ leadership. For Shane (academic):

You see, as I have indicated, I’m just getting a sense that HODs are not professionally empowered in terms of performance management. Because I was under the impression that...once you’ve agreed with your line manager, the dean has to just approve and send everything to the HR...But now it looks like the dean has no full confidence on HODs as line managers.

Jay (academic) also offered his observation of his HOD as someone under the dean’s power:

...most times she takes instructions from the dean that should have been interrogated first by HODs at their level as executive...before they come to us. But you can’t bring the idea to me...and I know it’s personal...and you tell me, no, because the dean has said it. Did you ask? No, the dean insisted we should do it.

Sandy (academic) alluded to the deans yielding power in more nuanced and probably unintended ways. However, it has the same silencing impact. She described her dean’s influence among the faculty’s HODs:

He being a... strong character, because I think that my line manager is a very strong person. You...learn also that there are bad things about being strong. Because that tends to...lend itself to...the perception that you might be domineering. So you tend to have an effect where people would actually suppress what they feel

because they are scared. Or, not scared. I think scared is...a bad word. I think sort of intimidated or sort of unsure because of how well versed or how well knowledgeable you are as a leader. So, I think for me that...is the one aspect of leadership that I will look at that maybe...that's not such a good thing...

Sandy's observation reflects Learmonth and Morrell's (2017) view that leadership can become a manipulative and controlling tool:

This is because the cultural valences associated with the language of leadership imply neither struggle between leader and follower nor anything else that might be particularly oppressive or oppositional. Rather, they suggest that the norm is friendly relations, and that a person's (i.e. a so-called follower's) primary allegiance is (or should be) to her leader – not solidarity with other workers. (p. 266)

Both participants place HODs in follower positions but agentially subordinated to their deans. This situation places HODs on a shaky ground for exercising leadership. In this respect, academics are evidently not inclined to grant HODs a leader identity or leadership role. HODs also alluded to the unhealthy hierarchy that stifles them from exercising leadership in managing staff's performance:

So, if you're working in an environment where you have very autocratic top management, you don't allow any room for thought or anything. We just do what you say. You'll then have people below that tend to treat the staff the same way, because they know it's futile to try something new or something different. (Carter, HOD)

PM consistency meetings, where final performance appraisal ratings are determined, appear to place a severe constraint on HODs' possibilities for leadership. At SU, the rating scale ranges between five and one, with five indicating exceptional performance and four excellent performance. These signal that employees' performance has attained more than the contracted performance targets. A rating of three indicates adequate performance, which signals achievement of the contracted targets. Ratings of two and one signal poor performance and non-performance respectively. Charles (HOD) and Noel (HOD) related their experiences of appraising their colleagues' performance at the end of the year. Their ratings were overruled at their faculties' consistency meetings directed by the deans. Noel (HOD) tried to approach the ratings realistically by taking into consideration the academics' context and the authenticity of their performance as opposed to seeking the 'high performer' who can play the game:

Here is a person who can't play the game but still managed to publish one article. So, when I rate them...I actually try to rate them higher. The issue now becomes...but then how am I going to justify that to the dean? The problem is always trying to justify. So I've consistently rated my staff higher than the dean approves. So, last year for instance, the dean did reduce the ratings for many in the department and generally across the faculty.

Charles found himself in a difficult position when he had to explain to a staff member the consistency meeting's decision to reverse a rating of four:

I mean, the worst for me...I gave a person a [rating of] four and it went to a [consistency] meeting and they felt that it wasn't a four. And that responsibility became mine to communicate back to the staff member. And I have a problem with that because that's not me that decided that. The dean should actually bring those staff members in and say, "unfortunately the committee felt that...wasn't a four. Your HOD defended it and unfortunately the committee overruled it". Because now it comes back to I've said yes...and that's not good for relationships. (Charles, HOD)

Rosemary (HOD) was similarly conflicted in having to relay the dean's message of a lowered rating:

Also feeling too bad to tell them that you haven't got quite there yet. Because I know they've worked really hard to get there. So then, it's easy to shift the blame then saying, "well, it was not awarded". Rather than saying, "you need to push so much more harder" because I really know they're working to their max [maximum].

Cameron (academic) made an insightful comment:

Now, I look at my remuneration for my performance appraisal...for now the HOD doesn't have a foot to stand on because the dean has overruled him. So the HOD comes back to me and says the dean said, "I have to give you a [rating of] two". What is that saying to my confidence in my line manager/HOD? So it's going to affect my performance next. So, that means I'm going to say to you, "I'll just do the bare minimum because I got a two". I'll just do a two because even if I do a five, if I do so much, the dean still got the ultimate decision-making power, which doesn't work with me. He doesn't see me perform. He was getting the processes and seeing a, b, c, d, but now the dean is subjective because you might have a run in with the dean.

In the examples reported above, HODs' PM decisions were overruled. This demonstrates how the PM process at SU negatively affects academics' confidence in their HODs. These examples show how HODs find themselves in an ambivalent position. On the one hand, they are obliged to follow their deans' instructions while on the other hand, HODs are aware that this undermines their colleagues' confidence in them. Managerialism holds sway in these circumstances. Any power that HODs may have is nullified. HODs are caught in a difficult situation. Their superiors in the hierarchy expect them to safeguard the university's interests, whilst at the same time their departmental academic staff expect their HODs to be their representatives and to shield them from executive power (Cilliers & Pienaar, 2014; Johnson, 2002). Academics' perceptions of the power that HODs can or cannot wield shapes or constructs their acceptance or rejection of HODs' leadership. In this study, participants perceive HODs to have limited power and therefore question their leadership. The research participants' experience suggests that HODs' positional authority is merely rhetorical (Middlehurst, 1993) and rests on a shaky ground. Although it is assumed that managers have more power than subordinates (Blom & Alvesson, 2018), which provides a premise from which managers can lead, in my study it appears that academics do not regard their HODs as being more influential than them. This closes the door on HODs' leadership.

Participants made little reference to leadership in their accounts of their experience of PM, except when I prodded. Even then, there was a hesitation in providing 'leadership' accounts. I ought to have understood this as an indication of HODs' negligible leadership practice. Alvesson and Sveningsson (2003) refer to the disappearance of leadership, although in my study, perhaps, it is a case of leadership in absentia. Academics recognise HODs as managers of their departments but that leadership is not an inherent outcome of their HOD's role. With increasing managerialism and complex challenges in HE, it is incumbent on HODs to exercise leadership (Bolden et al., 2012). Academics expect HODs to demonstrate leadership. However, that leadership seems to be largely contingent upon how HODs deal with PM. Academics' concerns point to a need for HODs' to exercise leadership by proactively intervening in or confronting PM issues, in relation to decisions about performance rewards in particular. This relates to Blom and Alvesson's (2013) notion of leadership on demand, where:

Demand indicates an interest in 'receiving' managerial leadership, i.e. taking a clear (but possibly temporal, conditional or situation-specific) followership position in relation to a formerly superior manager and viewing him/her as a leader, i.e. a significant source of meaning-making, support, and/or direction. (p. 1)

Typical of knowledge intensive organisations, where subordinates' work is driven autonomously (Alvesson & Sveningsson, 2003), academics in this study have preferences as to when and under what circumstances HODs should lead. So "the need and space for leadership is limited" (Alvesson & Sveningsson, 2003, p. 376). Leadership in this context is an unstable notion. It prompts questions such as, "who is regarded as being a leader, where leadership is seen to be done or needed, how leadership is thought to be done, and what exactly leadership is thought to be" (Alvesson & Spicer, 2012, p. 374).

Academics' perceptions that HODs' hierarchical authority is undermined by their deans' power reflects that HODs have been stripped of their formal leadership influence. Consequently, these academics do not recognise their HODs as leaders. In SU's constraining PM context, reported on by both academics and HODs, one would assume that power would be the focal point of contestation and that there would be an exploration of alternative modes of exercising power. Research could examine modes that enable the practice of freedom. For instance, formal hierarchical authority is not the only means through which HODs can enable their departments to function. They could explore their social or informal networks that give them social power (Chiu et al., 2017). It is patent here that "managers' influence and power helps followers see them as leaders or not" (Chiu et al., 2017, p. 335).

As Wilson (2014) suggests, "the positioning of followers is contingent on the assumptions made about both leaders

and followers” (p. 27). In positioning academics from a non-leader-centric perspective, “... we rethink followers as knowledgeable agents, we can begin to see them as proactive, self-aware and knowing subjects who have at their disposal a repertoire of possible agencies within the workplace” (Collinson, 2011, p. 185). The data reported above provide evidence of SU academics’ non-leadership assumptions about HODs. The academics are not willing followers and they have not relinquished their agency. Their positioning is not passive. They do not regard their HODs to be worthy of their followership. There is negligible evidence to support a vertical or top-down reading of HODs’ influence on academics. It is arguable then that there is no HOD leadership, let alone critical leadership. In the same vein, HODs also are not ready and willing leaders.

This finding aligns with the de-romantisation of leadership that de-emphasises leader-centric organisational relationships. These academics as followers prompt organisational modes beyond the traditional confines of leadership. While there is a distinction between positional authority and leadership, in this study the academics view authority as important to HODs’ leadership. It suggests that power is situated in positional authority. Collinson (2014) posits, “it is leaders who typically exercise considerable control over: scarce resources; decision making; structures, rules and regulations; formal communications; strategies and visions; corporate cultures; performance management; rewards and sanctions; and hiring and firing” (p. 37).

Conclusion

My aim in this paper was to problematise the conventional understanding of leadership as a necessary and all-encompassing organisation mode that is inherently good or worthy and superior to all other organising practices. Fundamental to this paper is my question: “Why did I look to leadership as a solution for PM problems at a university?” People in organisations and leadership scholars alike treat leadership as a priceless currency that is immune from economic fluctuations. To disturb its stability or enduring value is like disturbing a snake in its hole, that one will regret. Why would one risk causing such a disturbance? The discourse of leadership has had an overbearing and enduring influence on human relations in organisations and in society. Leadership is regarded as the premise upon which all organisational purposes, functions and activities are defined and given meaning. Over time, leadership has become deeply interwoven in all aspects of organisational thinking and practice. Unfortunately, this state of affairs has largely trapped us in a web of fallacies about the unquestionable need or value of leadership in organisations. We then fail to take into account the possibility of other ways or modes that effect organisational success or that prevent leadership failure.

An interrogation of academic HODs’ role in PM is not simply about leadership. As I argued earlier, HODs’ role in PM is a complex phenomenon and, depending on the context and identities of the parties in the PM process, other organising modes should be examined in understanding PM dynamics and, importantly, in making it a non-subjugating and amenable process. For the academics in the study, HOD leadership is not on demand. The data point to subjugated HODs with little or no influence over the academics in their departments. This points to the non-centrality of leadership in academics’ daily performance. Autonomy appears to be the precipitator of PM as a tool to achieve performance ‘outcomes’. In the context of my study, such a leadership demand is determined by or dependent on how HODs engage with PM from a non-subjugating or neoliberally dubious perspective. HODs’ leadership is good only insofar as they are conscious of academics’ limited need for leadership. This is due to academics’ performance being supported by their own autonomy and peer networking.

Further emphasised in the study is the distinction between management and leadership in HODs’ complex positions in universities. These are not always mutually exclusive, as is often inferred in how we talk about them. In these organisational spaces, the power dynamics among leaders and followers is unbounded, interchangeable and complex. The discussion also illuminates the need to interrogate HODs’ informal networks as possible sources of social power, since their hierarchical authority is diminished or annihilated even by the deans’ power.

The reflexive leadership approach adopted in this study highlights the limited role of leadership in the HOD-academic dynamic. It confirms academics as knowledgeable professionals, reliant on their own expertise or peers instead of leadership, which is often perceived to be a hindrance. Importantly, the reflexive approach provides opportunities to critically review multiple and diverse organising modes in the contemporary university. It offers an understanding of existing organising modes’ dichotomies and highlights their value in organisational life. However, a reflexive approach does not argue against the importance of leadership in university departments, save for taking heed that an exaggerated dependence on leadership can blind one to alternative work-organising practices. Leadership should not be a mode that is thrown at every work situation, as there is a place and time for leadership in knowledge intensive organisations such

as universities. Of particular importance is the positioning of HODs in the eyes of academics, where HODs' leadership becomes contingent on a situation.

In a context where leadership reflects followers' needs for independence, such leadership is the overarching mode under which other modes are enabled. It diverts us away from predominantly hierarchical descriptions of relations in organisations. It clarifies the distinction between vertical and horizontal hierarchy. In adopting a reflexive approach, I have examined a romanticised view of leadership, which constrains a critical understanding of how followers influence leadership. In the HOD-academic dynamic, I suggest that followership is an important variable in understanding leadership in academic spaces. The lesson in this study is that one has to avoid overplaying a leadership discourse, which reifies its excessive power; thereby giving it more latitude than it is due.

References

- Alvesson, M. & Blom, M. (2015). *Unplugged - "Carte blanche"* Less followership, less leadership? An inquiry into the basic but seemingly forgotten downsides of leadership. *Management*, 18(3), 266-282.
- Alvesson, M., Blom, M., & Sveningsson, S. (2016). *Reflexive Leadership*. London: Sage.
- Alvesson, M. & Kärreman, D. (2013). The closing of critique, pluralism and reflexivity: A response to Hardy and Grant and some wider reflections. *Human Relations*, 66(10), 1353-1371.
- Alvesson, M. & Kärreman, D. (2016). Intellectual failure and ideological success in organization studies: The case of transformational leadership. *Journal of Management Inquiry*, 25(2), 139-152.
- Alvesson, M. & Spicer, A. (2012). Critical leadership studies: the case for critical performativity. *Human Relations*, 65, 367-390.
- Alvesson, M. & Spicer, A. (2014). Critical perspectives on leadership. In: Day DV (ed.) *The Oxford Handbook of Leadership and Organizations* (pp. 40-56). Oxford: Oxford University Press.
- Alvesson, M. & Sveningsson, S. (2003). The great disappearing act: difficulties in doing "leadership". *The Leadership Quarterly*, 14, 359-381.
- Ball, S.J. (2015). Subjectivity as a site of struggle: Refusing neoliberalism? *British Journal of Sociology of Education*, DOI: 10.1080/01425692.2015.1044072
- Blom, M. & Alvesson, M. (2014). Leadership on demand: Followers as initiators and inhibitors of managerial leadership. *Scandinavian Journal of Management*, 30, 344-357.
- Blom, M. & Alvesson, M. (2015). All-inclusive and all good: The hegemonic ambiguity of leadership. *Scandinavian Journal of Management*, 31, 480-492.
- Blom, M. & Alvesson, M. (2018). Beyond leadership and followers: working with a variety of modes of organizing. *Organizational Dynamics* <https://doi.org/10.1016/j.orgdyn.2017.12.001>
- Bolden, R., Gosling, J., O'Brien, A., Peters, K., Ryan, M., & Haslam, A. (2012). *Academic Leadership: Changing conceptions, identities and experiences in UK higher education*. Leadership Foundation for Higher Education, Final Report Research Development Series 3(4). London: University of Exeter.
- Chiu, C., Balkundi, P. & Weinberg, F. (2017). When managers become leaders: The role of manager network centralities, social power, and followers' perception of leadership. *The Leadership Quarterly*, 28, 334-348.
- Cilliers, F. & Pienaar, J.W. (2014). The career psychological experiences of academic department chairpersons at a South African university. *Southern African Business Review*, 18(3), 22-45.
- Clarke, C.A. & Knights, D. (2015). Career through academia: Securing identities or engaging ethical subjectivities? *Human Relations*, 68(12), 1865-1888.
- Clegg, S. & McAuley, J. (2005). Conceptualising middle management in higher education: A multi-faceted discourse. *Journal of Higher Education Policy and Management*, 27, 19-34.
- Collinson, D. (2011). Critical leadership studies. In A. Bryman, D. Collinson, K. Grint, B. Jackson, & M. Uhl-Bien (Eds.). *The Sage handbook of leadership* (pp. 181-194). London: Sage.
- Collinson, D. (2014). Dichotomies, dialectics and dilemmas: New directions for critical leadership studies? *Leadership*, 10(1), 36-55.
- DeRue, S. & Ashford, S. (2010). Who will lead and who will follow? A social process of leadership identity constructions in organizations. *Academy of Management Review*, 35(4), 627-647.
- Gleeson, D. & Shain, F. (1999). Managing ambiguity: between markets and managerialism - a case study of "middle" managers in further education. *The Sociological Review*, 47(3), 461-490.
- Grint, K. (2005). Problems, problems, problems: The social construction of leadership. *Human Relations*, 58(11), 1467-1494.

- Guest, G., MacQueen, K. & Namey, E. (2012). *Applied thematic analysis*. Los Angeles: Sage.
- Hosking, D. M. (2008). Can constructionism be critical? In J. A. Holstein & J. Gubrium (Eds.), *The handbook of constructionist research* (pp. 669-686). New York: Guilford Press.
- Johnson, R. (2002). Learning to manage the university: tales of training and experience. *Higher Education Quarterly*, 56(1), 33-51.
- Knight, P. & Trowler, P. (2001). *Departmental leadership in higher education*. Buckingham: SRHE and Open University Press.
- Learmonth, M. & Morrell, K. (2017). Is critical leadership studies ‘critical’? *Leadership*, 13(3), 257–271.
- London, C. (2011). Measuring how the head of department measures up: Development of an evaluation framework for the head of department role. *Quality in Higher Education*, 17(10), 37-51.
- Meindl, J.R. (1995). The romance of leadership as a follower-centric theory: a social constructionist approach. *Leadership Quarterly*, 6(3), 329-341.
- Meindl, J.R., Ehrlich, S.B & Dukerich, J.M. (1985). The romance of leadership. *Administrative Science Quarterly*, 30, 78–102.
- Middlehurst, R. (1993). *Leading academics*. Buckingham: Open University Press and The Society for Research into Higher Education.
- Moore, A. (2012). Following from the front: Theorizing deliberative facilitation. *Critical policy studies*, 6(2), 146-162.
- Murphy, M. & Curtis, W. (2013). The micro-politics of micro-leadership: exploring the role of programme leader in English universities. *Journal of Higher Education Policy and Management*, 35(1), 34-44.
- Ngcamu, B. S. (2013). The Empirical Analysis of Performance Management System: A Case Study of a University in South Africa. *Journal of Economics and Behavioural Sciences*, 5(5), 316-324.
- Nguyen, H. (2013). Middle-level academic management: A case study on the roles of the heads of department at a Vietnamese university. *Tertiary Education and Management*, 19(1), 1-15.
- Prichard, C. (2000). *Making managers in universities and colleges*. Buckingham: SRHE and Open University Press.
- Rowley, J. (1997). Academic leaders: Made or born? *Industrial and Commercial Training*, 29(3), 78-84.
- Saldaña, J. (2009). *The coding manual for qualitative researchers*. Thousand Oaks, CA: Sage.
- Seama, S. (2013). An exploration of the University of Johannesburg Heads of Departments’ experiences and perceptions of the University’s performance management system. In F. Gouws & C. Wolhuter (Eds.), *Educational research in South Africa: Practices and perspectives*, (pp 223-244). Cape Town: Oxford University Press.
- Seyama, S.M. & Smith, C. (2015). "Not worth the sweat": Performance management rewards at a South African university. *Indo-Pacific Journal of Phenomenology*, 15(2), 1-13.
- Seyama, S. & Smith, C. (2016). Performance management as panopticism: Embedding intellectually repressive conditions in academia. *Socioeconomica: The Scientific Journal for Theory and Practice of Socio-economic Development*, 5(10), 171-188.
- Taylor, J. & Machado, M. (2006). Higher education leadership and management: From conflict to interdependence through strategic planning. *Tertiary Education and Management*, 12(2), 137-160.
- Wilson, S. (2014). *The maintenance of leader-centricity via the discursive subjugation of the follower*. A paper submitted to the Critical Management Studies Division for the Scholarly Program of the 74th Annual Meeting of the Academy of Management.
- Wolverton, M., Ackerman, R. & Holt, S. (2005). Preparing for leadership: What academic department chairs need to know. *Journal of Higher Education Policy and Management*, 27, 227-238.

Portrayal Of Perception Of Women In Domestic Series And Its Comparison With The Real-Life Woman's Figure, From Woman's Perspective

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Abstract

Aim and Importance of the Study: TV series play a key role in shaping the society. In this study, the aim is to identify the authenticity of the woman's roles portrayed in the series with the real life and make comparison of with the real-life woman's figure as well as to review the image of woman from woman's perspective, which is represented to the public and determine to what extent this image can be perceived as role model. This study intends to raise awareness in resetting and redesigning women's roles in TV series.

The Research Method: In this study, out of Qualitative Research Methods, the method of interviewing was applied. Stewart and Cash (1985) described interviewing as "a process of dyadic, relational communication with a predetermined and serious purpose designed to interchange behavior and involving the asking and answering of questions". From woman's perspective, 10 women professionals got involved in the research conducted on the portrayal of perception of women and its comparison with the real-life woman's figure and their responses were analyzed using the qualitative research methods. The relevant resources in literature were also reviewed and the woman's figure in TV series was examined.

The Study's Aim and Research Questions: In today's broadcasting, TV series have great importance. This study aims to assess the perception of woman in TV series followed by a great majority of public from woman's perspective and examine the presented perception through comparison with the real-life woman's figure, and these research questions were asked such below:

- 1) How do you think are women portrayed in domestic TV series?
- 2) What extent is that model of woman authentic with the real life?
- 3) What would you say when asked to characterize the women that you have viewed in the series?
- 4) Do the economic statuses of the women portrayed in TV series correspond to those in the real life?
- 5) How should the woman's figure be in those series when considering its potential implications in the society?

Findings and Conclusion: As a result of this study, it was observed that there are limited similarities between the serial female characters and the real life figures. It is observed that they are portrayed as powerless, weak, whiny and under male dominance, or class- and power-focused, wealthy, ambitious, dominant and intriguing and with beautiful physicalities.

Keywords: *Perception of women, domestic series, television*

Introduction

Women have a very powerful, important and determinant role in society. To identify social attitudes and behaviors, education given within the family or in the education system undoubtedly has great importance. Education might be very determinant of the social structural analysis, particularly family education. Another concept of these determinants is media, one of the key figures in social engineering.

In any individual's whole life or only specific part of it, women have always played a vital role. They shaped a big part of the physical, psychological and educational development of each of us, regardless of gender. The women, as mother, sister, and/or partner, are moulders of the set of human behaviors that these social determinants are often learnt unconsciously and transformed into characteristic structures.

The female role is very critical that they are one of the key determinants in family or society because every individual is grown up with a female model. However, we need to mention another dynamics that are moulded by women within the community. Undoubtedly that is media which is one of the main factors shaping the society whether deliberately or unintentionally.

Since 1950's, media has emerged as the principal actor in the formation of social dynamics including the investigation of the ideological structure and behavioral pattern of the public and the role model structures of the individuals. Out of various media instruments, television is major one with its influencing power. In this sense, the fact that TV programs are shaping our society has for long been taken as given.

In TV broadcasting, the series and the behaviors referred to the female characters in these, and the extent to which their characteristics correspond to the real life woman's image can be designed as a research topic. It has been mostly recognized that TV has the dominant role in the opinion leadership for society or the thought determinant, however one of the key contributing factors is rating and audience measurements.

TV series are one of the elements capturing the highest ratings in broadcasting, which provide key economic inputs. It may not be admittedly very realistic in terms of both ratings and attention that the female characters in the series are supposed to jibe with the women's image in reality.

Notwithstanding all this, this study aims to recognize how a female character portrayed in TV series is viewed from the women's perspective in the real life and try to see what the perception of women is and should be in these series which are moulding and caring for the society in female's eyes.

"We should take into consideration that media not only shapes the views and attitudes of men and boys towards women and girls to some extent but also consolidates the women's negative thoughts about themselves." (Özkeran, 2004; 21)

In Turkey, women's social contributions were considered when the role of their determinant and moulding elements was recognized, and some media roles were attributed in this way. The women's role have been re-established, which was seen as bringing up kids to be good family members and being an effective instiller of moral and humanistic values with abstract social rules. In social understanding, woman's figure very often takes place as guiding the family unity, catalyzing intrafamily mechanism, and acting as a natural unifier. Female in TV series is a visual icon of the society and however rather associated with the virtue-oriented behaviors moulding the family and being out of the basic needs of the public such as moral and humanistic values and abstract social rules. The media reflection and the public acceptance of such perception also could possibly be come across in these days (e.g. Ekmek Teknesi (*Bread and Butter*), Perihan Abla (*Sister Perihan*), Bizim Mahalle (*Our Neighbourhood*)).

"In Turkey, the programs for women was first originated with "Ev Saati" (Home Time) on radio in 1939, which would continue under the name of "Ev İçi" (Intra-House) on the matters including child care, health, and family, in general. In broadcasting objectives for such programmes, women are described as one of the basic elements to realize the happy aspects of society. Although women are specified as good partners and mothers in family as well as humanbeing in the world and citizen in the society, they cannot get out of the identity of housewives restricted within the walls of home (Akbulut, 2004:159).

Society is like a living organism which is living, transforming, developing, and improving itself. The behavioral ways of individuals in the community and their responses to phenomena and statuses can be regarded as the mechanism that is keeping the society alive and developing and changing it. The role of media has a very substantial role in shaping the public opinion. TV channels, radio broadcasts, newspapers, magazines, periodicals, and all publications are the most important part of this formation and perception, as well as digital media and social networks that are increasingly getting more important.

In this sense, TV broadcasts, the principal actor of media, have undertaken a serious role in the perception of women since they were launched in public. It can be acclaimed that TV's impact might have continued almost unabated from then on. Shaping and shifting the society, TV programmes gave a role to women especially in the earliest years. This consists of a whole of references characterizing women and crystallizing how the community should read the perception of women. The perception of women who are fond, lenient, altruistic, devoted, value family unity above all, bring up good boys and at the very core of their characteristics, include the notions of chastity and selflessness, was manifesting itself in almost all programmes (e.g. Kaynanalar (Mothers in law), Bizimkiler (Our Family), Yedi Numara (Number Seven)).

"Once TV broadcasting commenced following radio, many programs have been made for women. In these, traditional roles of women, such as a self-sacrificing mother, a good wife, and a housewife, were highlighted. Most effective and common instrument of culturization in modern societies, television is major one of the mass media putting their stamp on our age. Women represented in series, films, ads, music clips, magazine programmes are mostly portrayed with their sexuality and become exploited by media. Females in TV shows have to be well-groomed and good-looking, that's the most important one of the required qualifications is that they have beautiful physical appearance. It would not be exaggerated to say that females are currently transformed to visual objects on TV." (Büyükbaykal, 2011)

The perception of women portrayed in domestic series from mid 1990's till the earliest 2000's gave way to a modern, ambitious and aggressive model of women with a substantial change experienced in the early 2000's. Female characters in the series of 1990 had the stories in which she was just stuck in the middle of a large family and sometimes the oppression of tribal culture and also had went through the trials and tribulations while she had difficulty in adaptation phase to those traditions and seldomly made uprising (e.g. Asmalı Konak (Vine Villa), Zerda (a female name), Beyaz Gelincik (White Weasel), Sila (a female name)).

Many stereotyped codes used for male and female characters in Yeşilçam (Turkish) melodramas now reappear in disguise with the modified screens of our domestic series (sometimes undisguised, exactly the same). The traditional patriarchal discourse is getting more powerful in time." (Özsoy, 2018)

Of the female image in these series, passivity as a common approach almost never changed. Women was not rulers but obedient, or not playmakers but always defenders or guards against intrigues. The study of TÜSIAD (*an NGO in Turkey*) on the perception of women over 12 series noted the standardized female model.

In a relevant news, Özlem Gürses from Sözcü Newspaper reported: “TÜSIAD releases the study findings of ‘Perception of Women in TV series’. This suggests that ‘women are portrayed in 12 series most popular in Turkey much apart from reality and unfortunately in one single stereotype: like the creatures which are never businesslike, always whinny, flabby, and mopy.’ In this study conducted by TÜSIAD in partnership with a university, 12 out of the most popular series in Turkey was sampled and each one of them was analyzed frame by frame during the month of May. That news is going on like: *“The results are sobering! We often use a language to feed these stereotypes and prejudices even regardlessly. Whereas the intelligents engaged particularly in the ad and series sectors are highly creative and exceptional, and even they have freshly recognized by means of our these studies. The same problem is also valid for males; as much as one man is persistently portrayed in series as aggressive, red-hot, violent, this bad image sticks on men. Above all, females are jammed with physical shapes, and while males are represented at every point of the spectrum, they are all imaged as under 39, skinny or fleshy and matronly. Here is the thing that is “rendering the diversity” in every respect. Women are romantic, it’s alright, but how about men? Or vice versa...”*

The image of women who are always suffering, aggrieved and underdog due to her devotion to ethnic group or tribal order and sometimes obliged to be quiet, got changed across several series with female image, a “headstrong woman” who sets up the rules on her own and modifies traditions as a clan leader or under the matriarchal structure, or a powerful, cunning and intriguer woman in historical series (e.g. Hanımın Çiftliği (Lady’s Ranch), Kara Melek (Black Angel), Hürrem Sultan (*a figure from Ottoman Dynasty*)).

One model of the female characters in domestic series that TV broadcasters used includes the figures who are always oppressed, suffering, downtrodden and having few friends around (e.g. Fatmagül’ün Suçu Ne? (What fault could Fatmagül have?), Acı Hayat (Living Death), O Hayat Benim (This is My Life), Aliye (*a female name*)). From the early 2000’s, a new woman’s image reappeared that she was financially more independent, social, prestigious, having more active status and sometimes under the pressure of matriarchal structure.

“Females are used as sexual object particularly in magazine programmes or foreign series, and domestic TV series have more conservative image of women. Represented in accordance with Turkish traditions and customs, they are featured by their role of good mother and wife. In domestic series which portray the conventional roles of women, their real statuses are reflected in some respect.” (Büyükbaykal, 2011)

All these series have common point of non-concordant characters with normal course of real life, implausible, exceptional coincidences, non-fictionalizable unusual incidents, and unrealistic female characters. From the early 2010’s, gorgeous, attractive women with beautiful physical features are seen on the screen in the series. Female models who are care and make-up even when she has just got up, have luxurious autos, work for holdings and in plazas, and have no financial problems are embodied in series over the theme of love and affairs, and intrigue. These non-productive women who are not featured by their professional qualifications take place with the image intrepid, unabstainer from telling lies and obsessive to reach their goals.

“The characters (starred couples) in domestic TV series that permeate into our lives in the adventure of domestic series from past to present and deeply affect many parts of the society gain popularity with their lives of violence, loves and conflicts. Male characters of domestic series have got their women and envy them to die while female characters are always ready to sacrifice anything that they own any time. It means that they can immediately throw away their facilities and equipment that they have earned in life for the sake of their love. Self-sacrificing for their purity, family and children and fidelity are less than nothing for them.” (Özsoy, 2018).

The images included in communication codes of media apparently serve the conventional ideology consolidating women’s dependency and secondary status. A number of TV series broadcasted on prime-time lay emphasis upon the priority of the women’s roles relating to their home and family (Kalan, 2010:81).

In their most of life the individuals must have had at least one woman. People’s physical and psychological developments are characterized by the presence of women. Female in the figure of mother, sister and wife is the moulder of the set of behaviors which specify the social dynamics, are often learnt unwittingly and transform into characteristic structures.

There are sexual identities accepted by every culture, and their social norms determine how either one man or one woman should appear, act and relate to each other (Yılmaz, 2007:144).

Story line and distributed characteristic structures can be regarded as usual when considering the overwhelming portion of men in the group of senarists of serial films. However, the scenarios typed from men’s perspective sometimes may not represent as true the roles in life, the viewpoints to happenings, the situational assessments, and then character formation. This can also be one of the reasons why female image portrayed in the series is questioned.

The narrations that made by male story-tellers are the stories of man and mannishness that provides men with symbolic power. Modern communication instruments have an explicit role and been employed in functioning the gender-based process of representation and interpretation (Kotaman et al., 2011:78).

Findings And Conclusion

At between the years of 20 and 50, 10 females attended this study on “portrayal of the perception of women in domestic series and its comparison with the real-life women’s figure from women’s perspective”. The participants who are professionals and regularly watching TV (at least one hour a day) were demanded to answer the questions asked related to the perception of women in TV series. A proper environment was provided so that they can explicitly express their feelings and thoughts under no influence in response to the general, understandable and clear questions directed. The respondents’ answers were coded in the way of S:1 (for Speaker 1), S:2 (for Speaker 2), etc., and the given responses were examined with the method of content analysis and released below.

First a question was asked to the attendants such as: **“How is do you think the women’s model in domestic series represented?”** The respondents’ answers are such below:

(S:1) *“In TV series, there are female characters who are passive, directed and easily guided, and naive or lead any of their surroundings, try to figure all humans and events towards their request, desire to get their way and are quite malicious. That’s, a portrayal of character was made by power distribution; powerless women are portrayed as naive and directed, and powerful ones as ruling and villainous.*

(S:2) *“They are intrigue-oriented or meek/weak-oriented. The message in the intrigue-oriented group is the motto of “everything in love is fair” while those in the meek/weak-oriented need a man shakening and awakening her for meaningful life, actual renaissance, and controlled life. Apart from this main tendency, other side characters have its various levels in general. Triumphant women to gain a footing have traumas with accompanying and degrading somebodies and need a man safeguarding her to leave her troubles behind and become happy.”*

(S:3) *“The impression that I have got is that the theme in the series is usually, you know, that women who are downtrodden and uninfluential characters if it is Anatolian/chieftain/clan thematic one. In urban series, the profile of city women is such that seducers and coquette addicted to men or much intriguing and cunning females.*

(K:10) *“There are women’s models who we do not come across in real life. Too intriguer or too altruistic women”*

The respondents who assess the way of representation of female characters in domestic series made notable observations. Women are portrayed in series as passive, underdog, weak, battered, and tormented or intriguer, gossip, and lustful for power over others. Or they can be perceived as meek, weak with a character whose course of life suddenly shifts when she falls in love with a well-off and powerful man and who must require a masculine body to safeguard themselves so as to make achievements in life and recover from her troubles. Out of current series with high ratings, the one named “Ufak Tefek Cinayetler” (Little Murders) has four starred female characters. The series narrates the life story full of intrigues and lies belonging to these women living a prosperous and luxurious life, and the character with the name of Oya the doctor, whose college and personal life is turned into a living hell after she is slandered by her friends, despite being an idealist doctor, is portrayed as meek, weak, and non-self-advocate. Expected to have a key status in social life as a doctor, the character of Oya is taken under his wigs and looks to him as a safe harbor not until she is in love with a married man, which is the result of the mentality to portray women as passive.

It is also not different for the series of “Sen Anlat Karadeniz” with high ratings. This is about the incidents happened to the character of Nefes who is sold for money to a man by his own father and tormented, and then took shelter in Karadeniz (Black Sea) and had much trouble. This series which is attention-grabbing with too many scenes of violence has been criticized by audiences for the reason of “normalization of violence against women”. The starred female character, Nefes, is portrayed as battled, weeping, tormented and exposed to many other misdoings.

The respondents have negative thoughts about **“the consistency of the model represented in TV series with the real life”**. One stated that extreme troubles and emotions are normalized and economic class is highlighted that the reality concept in the public have been changed and reshaped by senarists: *“I think many cases in TV series are excessive in quantity and exaggerated. Again they, I think, are trying to create sense of familiarity and normalize such extreme negativities as they make the public view all these hyperbolic violence and excessive negative emotions, thoughts and actions persistently. The stories always make arguments on the subject of social class that the problems and conditions of humanbeings are differentiated according to socio-economic classes as much as I see, that’s the emphasis is too much on the class issue. By keeping similar stories told, people’s sense of reality in the society is rebuilt or reengineered by senarists and producers every day ...as well as male and female character models.”* (S:1)

Another respondent pronounced that the life represented in the series has no association with the real life: *“These series lead to adopt the reality in different and nonconstructive way. It is seen as though the achievements are subject to that sort of actions. And also, they emphasize the discrimination in social gender roles and created an effect like single woman is somehow defect. On the side of men, a new identity of classical men that has appeared within the modern version of traditional masculine model help people internalize the role of dominance and determination.”* (S:2)

One of the respondents pointed out the gap between the female model portrayed in the series and the real-life women’s model: *“In my opinion, it’s irrelevant. We can even see this when we look at houses and settings that these serial films are shot. The culture of extravagant consumption is overwhelming in the series. All environments*

are luxurious places. The houses are not normal, they are like the residents of palaces or residences. Hidden ads are embedded into the series cause a bad impression.” (S:8) and another replied “Although the characters in the scenarios can be sometimes simulated to the women in the lives of ours or our friends’, the series include exaggerations: the characters may live on the edge.” (S:4)

The respondents replied to the question of “**How would you describe the characteristics of the females that you have watched in series?**”

(S:1) “They are characterized by a social class and power-focused structure. Exceptionally, there are some characters including the women wealthy but more naive as well as the others deprived but highly passionate and thus desperately struggling to attain money and power.”

(S:2) “Having to pay off being powerful, weak, dependent on a man to deal with drawbacks in her life, usually downtrodden if not an intriguing character, oriented towards being like extension to a man rather than being individualistic.”

(S:5) “The women sex-oriented, male-dominant, oppressed, male-dependent, femme fatale, secret plots in closer kinship, yenta, and low brow. In short, the females who got there using their intelligence are unlikeable and in supporting roles. Yet, it depends on the series. For example, I mostly like two series... I am watching them because they are preponderantly psychological: Tehlikeli Karım (My Dangerous Wife) and Fİ. The female characters in those series draw my attention.”

(K:10) Beautiful, well-groomed, intriguer, self-sacrificing, lover, sneaky, brave, smart, gossipier, hypocritical, two-faced

The respondents make physical and behavioral assessment for the female roles in domestic series and highlight that women are intriguing, eagerly attached to a man, sneaky, self-sacrificing, highly courageous, downtrodden, dependent on husband, class- and power-focused, non-individualistic, weak, slim, beautiful, made-up, well-kept and manivured even if tormented. The warm-hearted characters are also represented as the secondary characters who are shy, diffident, and taking a backseat.

The responses to the question of “**What is the authenticity of the economic conditions of the women portrayed in the series?**” are such below:

(S:1) “The female characters’ economic attributes are characterized by the patterns of social and economic class. They are portrayed as being in the economic status, very high or very low. Apart from its trueness, persons in middle, middle-low and middle-high income groups have far less chances to be viewed on the screen, I think.”

(S:2) “By the fashion of poor girl to rich guy, which is considerably going on, a female character is featured, who sets for life by means of mad love of a wealthy man or makes a marriage of convenience with a rich person and gets out of her financial troubles. When she is possibly a woman who can stand on her own feet, she is in the position of paying a heavy price for it, being downtrodden, oppressed or isolated. Namely, there is like an inclination as if the woman had to receive a nasty blow from her safeguarding attached man in order to realize that goal.”

(S:3) It doesn’t mean that plaza women all are making good money. We may sometimes see them in high managerial positions in plazas but this won’t shift the real thing. Dreams and Realities. With the theme of sub-culture, some series may be a bit closer to reality.

(S:7) “Some are too rich or too poor.. There is no normal as family figure. Except for the series of Çocuklar Duymasın (Don’t Let the Kids Hear)”

(S:4) “The characters who generally mentioned in the series are financially easy and even sometimes got attention with their too much luxurious lives. They can be the exaggerated lives that do not correspond to the common social understanding.

To such question as “**What would you like the female character in series to be when considering their social contributions?**”, one replied “The female characters that I would like to view in the series are who come from any socio-ekonomik sub-structures in the society, are well-educated, coherent of their feelings, thoughts and actions, able to go through and cope up with their problems, suffering from their troubles without much dramatization, having positive personal characteristics, doing good things not only for themselves and their families but also for the community and the globe, working and earning their financial independence, self-aware and self-conscious as women, conscious of equal and democratic citizenship, and good role model to other girls and women in the society.” (S:1) and another respondent stated “There are such studies on as human relations, mate selections, individuality, self-identity formation, sexual roles, etc., but they are informed exclusively to a certain part. These can unfortunately not be addressed to general public and reached out low socio-economic levels through transformation into real life form. The series need to be designed with experts’ views from psychology, psychiatry and sociology, and the findings are embodied with the serial characters. The message made by the series can be that in order to stand on one’s own feet and be an individual, there is no need to pay a heavy price for it, for plots or submission to realize it, and provide insight with how is making choice, awareness of gaining from freedom, and how one can be able to differentiate the useful alternative from the useless one.”

(S:2) Other respondents’ answers are such below:

(S:7) “Firstly I would like the series to be genderless; that’s, without any discrimination of men or women, just a humanbeing. Women should have to stand on their own feet alone, intelligent, smart, and simultaneously funny. In other words, the female intelligence should be featured by the series.”

(S:10) “I would like to view females in the series who are workers, developers, good lovers, producers, readers and achievers while their sons and daughters must be happy mostly by such a women’s model. These perceptions should be focused in TV series.. affection and performance inside women won’t be oppressed but on the contrary will be uncovered. “

(S:5) “There should be female characters to be exemplar, away from twisting men around their fingers and exalted but not disparaged from men’s perspective.”

Starting from all these observations, the perception of women in TV series have unequivocally great importance with its critical role in shaping the society. When considering the role of women in the development of individuals in the society, the responsibility that should be undertaken by TV serial broadcasters is overtly substantial. As a result of the present study, it has been observed that there are not significantly any similarities between the serial female characters and the real-life women’s figures. The female characters are portrayed as powerless, weak, whinny, under male dominance, or class- and power-focused, wealthy, ambitious, dominant, intriguing and with beautiful physicalities.

The respondents indicated that the female model portrayed in TV series are rarely consistent with the real-life women’s figure. It is observed that the incidents characterized by female characters contain exaggerated, extreme and negative emotions and these thoughts and actions have been gradually normalized. In the series, the reality is made to be adopted in a different and unconstructive way, and the presence of single woman is explicitly portrayed as defect in minds by emphasis of the discrimination on social sexual roles. Regardless their jobs, the females are represented as the characters who are safeguarded by men and finally, fall in love with him and so have a meaningful life. In the scenarios overwhelmed by consumption culture, female characters live in waterfront residences, villas in much luxury, or in shantytowns in destituteness rather than modest real-life models.

Those attending the study pronounced that the female image represented in the series is not authentic and re-engineered by producers. The female characteristics that they would like to view can be listed as: originated from any socio-economic sub-structures in the society, well educated, coherent in her actions, keeping in touch with reality, not dramatizing her troubles, having positive personality, working and financially independent, able to be a good role model for other girls and women in the society, not require paying a heavy price for being an individual, aware of not having to resort to any intrigue to deal with issues, producer, reader, intelligent.

Reference

- Akbulut, TN. (2004) Türk Televizyonunda Kadın Söylemi. Kadın Çalışmalarında Disiplinlerarası Buluşma, Cilt:2,79-86
- Büyükbaykal, C. (2011) Medyada Kadın Olgusu. İletişim Fakültesi Dergisi
- Güngör, N., (2011). İletişim Kuramlar Yaklaşımlar. Ankara: Siyasal Kitabevi.
- Kalan, Ö. G. (2010). Reklamda Çocuğun Toplumsal Cinsiyet Teorisi Bağlamında Konumlandırılışı: ‘Kinder’ Reklam Filmleri Üzerine Bir İnceleme. İstanbul Üniversitesi İletişim Fakültesi Dergisi, 38, 75-90
- Kotaman, A., Samav Uğursoy, A., Artun, A. (2011). Televizyonda Hikâye Anlatıcılığı. İstanbul: H2O Kitap.
- Özerkan, Ş. A(2004) Bir Toplumsallaşma Aracı Olarak, Medyanın Kadın İmajına Yaklaşımı. Kadın Çalışmalarında Disiplinlerarası Buluşma, Cilt:2,21-29
- Stewart, C. J. & Cash, W. B. (1985). Interviewing: Principles and Practices (4. Baskı) Dubuque, IO:Wm. C. Brown Pub.
- Yıldırım, A. ve Şimşek, H (2006). Sosyal Bilimlerde Nitel Araştırma Yöntemleri. Ankara: Seçkin Yayıncılık, s:152
- Yılmaz, R.A. (2007). Reklamlarda Toplumsal Cinsiyet Kavramı: 1960-1990 Yılları Arası Milliyet Gazetesi Reklamlarına Yönelik Bir İçerik Analizi. Selçuk İletişim, 4(4), 143-156
- <http://www.aljazeera.com.tr/gorus/yerli-dizilerin-urettigi-siddet-cinsiyetcilik-ve-kadin-cinayetleri>
- <https://www.sozcu.com.tr/2018/gundem/dizilerdeki-kadin-algisi-degismeli-2309881/>

Post Occupancy Evaluation In Architecture Education

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Abstract

Interest of design professionals in Post Occupancy Evaluation (POE) is growing. Insights received from the POE can help informing the architectural design briefs. Therefore, POE has an important place in architectural education. Accordingly, Post Occupancy Evaluation (POE) is carried out with students within the scope of the elective Physical Environment Control course, which is taken in the 3rd year (5th semester) in Uludağ University Architecture Department since 2012. During the course, the concept of Post Occupancy Evaluation is given to students and then a questionnaire is prepared by the students regarding the key themes in order to evaluate user satisfaction. In this context, surveys were carried out with the users of various types of buildings such as education buildings, medical buildings, university campus buildings, public buildings, shopping centers, mosques, and light rail stations in Bursa. The results obtained from these questionnaires are evaluated statistically with percentiles and are then discussed and evaluated with students. In addition to the climatic, acoustic and visual comfort conditions of the buildings, positive or negative factors related to the design are being considered and it is aimed that these results will guide the students in future designs. Ultimately, it is considered that architecture students' opportunity to experience POE during their training will contribute to their professional lives by giving them the skills to create better quality physical spaces with optimum comfort conditions.

Keywords: *Architecture Education, Post Occupancy Evaluation, Building Design*

1. Introduction

Human needs are all the environmental and social conditions that enable users to maintain their lives in various ways (physiological, social, social, psychological, etc.) without discomfort and with the ability to be productive in their work (İnceoğlu, 1982). Because people spend a large part of their lives inside buildings, the quality of life provided to users is an important factor in meeting the human needs. After the initial usage of a building, where people live, work and carry out recreational activities, users understand if the building is able to fulfill their expectations in various fields such as space organization, functionality, technique and aesthetics, and this directly affects user satisfaction.

Architects have an important responsibility in designing a good quality of life for users and ensuring user satisfaction. Being able to respond to the needs of users is very important in designing and constructing successful buildings. Architects should design buildings with high user satisfaction based on the feedback they receive from users and should minimize mistakes in future designs. POEs are important for building performance evaluation, which helps to identify user expectations and existing problems in buildings. In architectural education as well as in professional architectural environment, providing students with POE experience will contribute to their professional lives by giving the skills to create better physical space quality. POE is handled differently in architecture education. For example, buildings' post-occupancy evaluation (POE) is carried out at Oxford Brookes University for more than 10 years. In general, the POE module runs in semester 1 over 12 weeks (and more recently 8 weeks) and is delivered through 12 sessions of 3 hours (36 hours contact time and 20 credits), combining lectures and seminars with the real case study building (domestic or non-domestic) to understand the cause and effect of both hard and soft issues on building performance. Students in groups of three or four conduct the POE of a building, thereby developing skills in teamwork and collaboration (Gupta, 2014). This paper describes importance of 'post-occupancy evaluation (POE) of buildings' into undergraduate teaching in Uludağ University, Bursa/Turkey.

2. Post Occupancy Evaluation

Post Occupancy Evaluation (POE) is an evaluation method used in many disciplines including academic literature, industry press and professional institutes. The first important work on post-occupational evaluation was conducted in 1960s in buildings such as in mental hospitals and prisons to observe some serious problems that seemed to be caused

by the structured environment. The evaluation of health, safety, security and psychological effects in relation to the usage of the environment were striking in these studies. In the 1960s, there have been an increasing number of studies on the relationship between human behavior and building design that led to the establishment of interdisciplinary professional associations such as the Environmental Design Research Association (EDRA) and the creation of a new field of environmental design research. Today, design professionals' interest in POE is growing.

POE offers an opportunity for assessing if architects in construction and architecture sectors are able to meet the requirements of buildings. According to Watson (2003), POE is an approach that can be conducted any time in the life course of buildings. Since 1960s, POE assessments were made for different building types (Preiser, 2002). Hospitals (DHFP, 1990; QHRS, 2001; Carthey, 2006; Ornstein et al., 2007), education environments (Evrin, 2010; Manahasa, 2017; SEE, 2005; Watson and Thomson, 2005; Mumovic et al., 2009, Tookaloo and Smith, 2015), convention and exhibition centers (Tanyer and Pembegül, 2010), offices (Voordt and Klooster, 2008), playgrounds (Moore, 1983), government and public buildings (Nawawi and Khalil, 2008).

Post Occupancy Evaluation is a building evaluation process where a building is evaluated systematically and regularly after being built and used. POE focuses on users and their needs, so that design decisions that have an impact on the design and construction of the building can be tested. As a result of evaluating the design decision in planning and comparing it with the end product, the strengths and weaknesses of the design can be determined. This information is transferred to new designs, while it is also used as feedback for the solution of problems in the existing environment. The knowledge gained becomes a basis for the designers for building better buildings in the future (Preiser et al., 1988, Karagenç Onur, 2002). The knowledge gained in this process also creates a basis for designers for building better environments in the future. According to Preiser et al. (1988), POE's purposes are: (Preiser et al., 1988)

- To collect information on solutions to urgent problems in buildings,
- Helping to solve problems that are encountered by building users, which were not understood during construction,
- Providing useful information that will help establish the balance between the user and the environment during the use of the building,
- Accepting building-related situations as data and using such to resolve issues in similar types of buildings,
- To generalize POE related information for updating existing design criteria, compiling them in order to prepare guidelines for the architecture profession.

According to Kirk and Spreckelmeyer (1988: 162), post-usage evaluation activities are a set of techniques used by architects and environmental designers to determine how the environment is used by users, and also to determine the level of satisfaction provided by specific design goals. This technique has recently been used to establish criteria for planning new designs based on the performance of the environments in use. Accordingly, the purposes of the Post Occupancy Evaluation studies can be listed as follows (Kirk and Spreckelmeyer, 1988: 162)

- Use existing environments to shape future environmental needs and requirements,
- Testing program and design goals,
- With the knowledge on how existing environments are used by users, updating and adapting them to meet the needs.

Despite great efforts of architects and other specialists, and despite the large number of constructions, it is often believed that such environments are unable to achieve satisfactory results in terms of performance. This may be due to the fact that the usage of the environment is not monitored sufficiently and similar mistakes may be repeated numerously. During the usage of built environments, productivity may decrease, health and safety problems may arise, users' comfort and satisfaction levels could be reduced. These results have proven the benefits of Post Occupational Evaluation (POE) studies, have grown POEs' field, and led to the development of activities (Karagenç, 2002). Preiser (1997) has attempted to identify the fundamental problems of environmental performance using Post Occupancy Evaluation studies. Identified problems that are related to performance are listed below (Preiser, 1997: 179).

- Health, safety and security issues,
- Comfort problems (poor thermal control and air circulation)
- Aesthetic problems

- Surface maintenance problems
- Waste of energy
- Poor image and direction finding problems
- Leakage problems

Whether it is related to technical, usage or behavioral criteria within the environment, understanding these problems are a step towards the solution of problems. This underlines the importance and utility of the use of Post Occupancy Evaluation studies. The utilization process and the size of the impact of the benefits arising from Post Occupancy Evaluation studies can be considered in three terms (Preiser et al., 1988)

Short-Term Benefits: Short-term benefits emerge as a result of the use of POE findings. In the short term, achievements and failures regarding environmental performance are identified and recommendations are made for problems to be solved. Additionally, Post Occupancy Evaluations' another short term benefit is related to dealing with problems arising out of budget cuts for reducing costs. Trying to keep project costs low usually lowers environmental quality. Post Occupancy Evaluation allows for higher quality and performance building production with lower costs. The short-term benefits can be summarized as follows: (Zimmerman and Martin, 2001).

- Identifying and solving space usage problems,
- Considering the issues that will increase the efficiency of the employees working in the area,
- Evaluating user opinions, who actively participated in the evaluation process,
- To make informed decisions and to better understand the results of the design,
- Establishing a relationship between budgetary constraints and performance.

Mid-Term Benefits: POE can provide solutions of identified problems in the building such as rearrangements, remodeling, and adaptation or can provide databases for larger constructions. Accordingly, mid-term POE benefits are related to the main decisions regarding building construction. Mid-term benefits are; (Preiser, 2002).

- Reducing costs in the process of construction, use and repairs,
- Providing opportunity to the designer to take part in the evaluation of space performance,
- Adaptation of functions to suit the new space usage for the changes to be carried out in time.

Long-Term Benefits: Long-lasting benefits are those that surface in 3-10 years after information on success and failures regarding the performance of the built environment are learned and applied to design of buildings to be built in the future; this POE benefit is related to architectural environments, such as hotels, office buildings, schools, and residences. Long-term benefits are; (Preiser, 2002).

- To produce measures to improve space design and construction quality,
- Making long-term cost plans,
- Establishing databases, standards, criteria and guidelines, and developing existing ones.

Reviewing users' satisfaction level from buildings is a common approach that aims to increase the efficiency of existing buildings and to guide future designs. In this regard, the Post Occupancy Evaluation - POE system has the following benefits as explained in "Post-Occupancy Indoor Environmental Quality Evaluation of Student Housing Facilities";

- Determining building problems and solutions in a short period of time,
- Enhancing building performance and feedback related to usage,
- Creating important costs savings during construction and the building lifecycle
- Creating long term improvements in building performance
- Creating a knowledge base for improving databases, standards, and criteria (Hassanain, M. A. 2007).

Although designers and customers benefit to a great extent from POE activities, the POE approach is not routine in design-project stage because of the following,

- POE costs are high,
- POE research is time-consuming,
- The designer or project owner does not want the mistakes to come to light (Evrin, 2010).

3. Method

The data collected with POE is believed to assist designing new buildings and will also assist implementation of new arrangements for existing buildings. For this purpose, Post Occupancy Evaluation (POE) is carried out with students within the scope of an elective course, which is taken in the 3rd year (5th semester) in Uludağ University Architecture Department since 2012. During the course, the concept of Post Occupancy Evaluation is given to the students and then a questionnaire is prepared by the students regarding the key themes for evaluating user satisfaction. Every 3rd year (5th semester) architecture students conduct surveys with the users of various types of buildings such as, education buildings, medical buildings, cinemas, university campus buildings, public buildings, shopping centers, mosques, and light rail stations in Bursa.

Surveys are one of the most effective methods to obtain a wide range of information (Zimring, 1987). Since the purpose of a survey is to measure how people interacting with a particular environment react to it; it is important to reach the largest group that interacts with the environment and learn their ideas. The results obtained from these questionnaires are evaluated statistically with percentiles and are then discussed and evaluated with students. In addition to the climatic, acoustic and visual comfort conditions of the buildings, positive or negative factors related to the design are being considered and it is aimed that these results will guide the students in the future designs. Figure 1 shows the workflow of carried out with students for post-use evaluation.

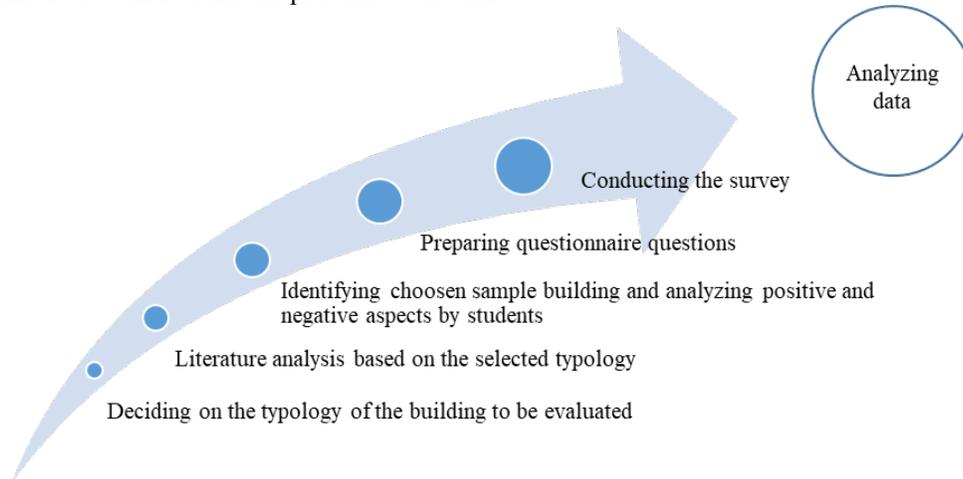


Figure 1. Workflow Chart

When the workflow diagram is examined it can be seen that the first decision is about the typology of the building to be evaluated. Students focus on buildings that they use, and that they will be able to experience the positive or negative aspects. In the second stage, a literature analysis is made on the selected typology and national and international studies to date about these buildings are examined. In the third stage, students are asked to do a study to identify the sample building they choose. It is expected from the students to observe and identify the problems or positive aspects about space setup, interior design, transportability, accessibility, ergonomics, thermal comfort, acoustic comfort, visual comfort, indoor air quality, service areas etc. After conducting preliminary studies and researching existing questionnaires related to the subject, work starts on the preparation of questionnaires for the subject. Although the prepared questions differ according to the type of building, the topics in Table 1 are questioned in general.

Table 1. Evaluation Criteria

Transportability	Pedestrian access to the building
	Perception of building entrance
	Position of building areas
Accessibility	Accessibility between storeys' circulation areas
	Ease of access to units
Ergonomics	Indoor storey height
	Size of windows
	Width of stairs and height of risers
Thermal comfort	Indoor temperature in summers
	Indoor temperature in winters
	Usage of artificial air conditioners
Audial comfort	Audial comfort
	Noise from installations
	Outdoor noise problem
Visual comfort	Natural lighting
	Artificial lighting
	Color preference
Indoor air quality	Natural ventilation
	Indoor air quality
	Odor problems in wet areas
Service areas	Catering and resting areas
	Wet areas
	Car parks
Socializing	Areas that enable social communication
	Open areas, courtyards
	Green areas that enable socializing

After survey questions are prepared, students are asked to conduct the questionnaires in groups of 2-3 people. Users evaluate satisfaction conditions, importance and performance of buildings using scores under between 1-5. 1 indicates "lower importance" and "poor performance", and 5 indicates "higher importance" and "better performance".

After the questionnaires are conducted, they are evaluated in the Excel program and the results of the questionnaires are revealed. The evaluation process of the questionnaires is transferred to the students in a simple way and the results can be easily transferred into percentages and graphs.

After the results are revealed, user satisfaction questions are reanalyzed and scored again on a 5-point Likert scale, which indicates the satisfaction or the importance level (very satisfied, satisfied, neither satisfied nor dissatisfied, dissatisfied, dissatisfied and can't choose).

In accordance with the survey data, the level of comfort score was voted within -2 and +2. Negative scores indicate user's dissatisfaction (negative points) and marked with bold characters, while positive scores indicate user satisfaction (positive points). The overall evaluations of case studies are summarized below in the Table (Figure 2).

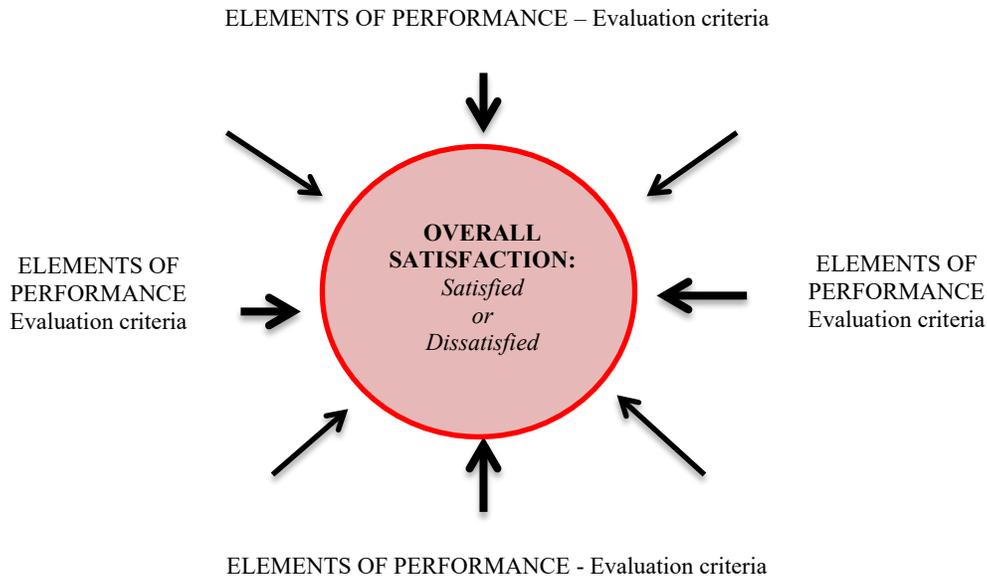


Figure 2. POE Evaluation Chart

As a result, satisfaction levels of users are determined under each of the performance criteria. Additionally, the respondents are asked open ended questions to evaluate the optimum comfort conditions of the buildings that they use to determine positive and negative performance characteristics of buildings. At the end of the study, students discuss what they can do in the design phase regarding the performance values that the users feel dissatisfied.

4. Conclusion

POE allows students to undertake thorough real-world research. POE studies are useful tools for generating evidence and feedback that are required for learning lessons from buildings. POEs also provide a valuable specialist skill in understanding and evaluating building performance, in relation to their own design and that of others, particularly for students that will be architects of the future. By strategically aligning POE and design studio, the gap between design intent and actual reality can be addressed.

In addition, students will be able to see and analyze different types of structures in place and examine problems faced by users, and consider the problems they encounter to support solutions. Also, students are encouraged to do research and gain experience in group work. More advanced levels of POE are supported in order to achieve more scientific and precise results by introducing the SPSS in the graduate programs.

According to the feedback received at the end of the course from students about their work, it was seen that using POE systems prior to the design phase was considered by the students to contribute greatly to the prevention of mistakes in design. It is apparent that because of all its positive contributions, introducing the POE system to the students in the architectural undergraduate programme and conveying it to students with examples will contribute positively to the architectural education process.

References

- Carthey, J. (2006) Post Occupancy Evaluation: Development of a Standardized Methodology for Australian Health Projects, the International Journal of Construction Management. July; 57-74.
- DHFP (1990) Indian health service hospital browning Montana facility post occupancy evaluation, Division of Health Facilities Planning, Office of Management, Office of Management.
- Evrin, T. (2010) Examination of post-occupancy evaluation method in Yildiz Technical University, Faculty of Chemistry and Metallurgy. YTU Master Thesis, Istanbul.

- Gupra, R. (2014) Embedding post-occupancy evaluation into architectural education. Association of Architectural Educators Conference (AAE). Low Carbon Building Group, Oxford Institute for Sustainable Development, School of Architecture, Oxford Brookes University.
- Hassanain, M.A. (2007) Post-occupancy indoor environmental quality evaluation of student housing facilities. *Architectural Engineering and Design Management*, 3(4), 249-256.
- İnceoğlu, N. (1982) Building Programming in Architecture Architecture, ITU, İstanbul.
- Karagenc O. (2002) Post Evaluation Model for Symbolic Performance in Mass Housing Areas, İstanbul.
- Kirk S.J., Spreckelmeyer K.F. (1988) Creative Design Decisions, A Systematic Approach to Problem Solving in Architecture, Van Nostrand Reinhold Co., NY.
- Manahasa, O. (2017) Children's and post occupancy evaluation in developing a communicative language to (re) design educational environments. ITU, Master Thesis, İstanbul
- Moore, G. T. (1983). Teaching design evaluation, with results from case studies of schools, schools, and housing for the elderly *Design Studies*, 4 (2), 100-114.
- Mumovic, D., Davies, M., Ridley, I., Altamirano-Medina, H., Oreszczyn T. (2009) A Methodology for Post-Occupancy Evaluation of Ventilation Rates in Schools, *Building Services Engineering Research and Technology*, v: 30, n: 2; 143-52.
- Nawawi, A., Khalil, N. (2008) Post-occupancy evaluation correlated with building occupants' satisfaction: An approach to performance evaluation of government and public buildings. *Journal of Building Appraisal*, 4 (2): 59-69. <https://doi.org/10.1057/jba.2008.22>
- Ornstein, SW, Ono, R., Lopes, ME, Monteiro, RZ, Gill, AA, Machry, HS (2007) Health Care Architecture in São Paulo, Brazil, Evaluating Accessibility and Fire Safety in Large Hospitals, *International Journal of Architectural Research*, 1(1), 13-25.
- Preiser W.F.E., Rabinowitz IL Z., White E. T. (1988) Post Occupancy Evaluation, Van Nostrand Reinhold, NY.
- Preiser W. F. (1997) Applying the Performance Concept to POE, *International Journal of Facilities Management*, 1 (4): 179-184.
- Preiser, W. (2002) The evolution of post-occupancy evaluation: toward building performance and universal design evaluation. Learning from our buildings: a state-of-the-practice summary of post-occupancy evaluation, Federal Facilities Council Technical Report No: 145, National Academy Press, Washington, DC; 9-22.
- SEE (2005) Post Occupancy Evaluation - Braes High School, Falkirk, Scottish Executive, Edinburgh.
- Tanyer A.M., Pembegul, T. (2010) Post occupancy evaluation of the architecture: a case study of Lutfi Kirdar Convention and Exhibition Center. *METU JFA*, 27: 1: 241-265.
- QHRS (2001) Royal Children's Hospital Post Occupancy Evaluation, Queensland Health and Royal Children's Hospital Health Service District.
- Tookaloo, A., Smith, R. (2015) Post Occupancy Evaluation in Higher Education. *Procedia Engineering*, 118: 515-521.
- Voordt, T, Klooster, W. (2008) Post-Occupancy evaluation of a new office concept in an educational setting. CIB W70 International Conference in Facilities Management, Heriot Watt University, Edinburgh, June 16-18th 2008.
- Watson, C. (2003) Review of building quality using post occupancy evaluation. *Journal of Program Education Building*, 35, 1-5.
- Watson, C., Thomson, K. (2005) Bringing Post-Occupancy Evaluation to Schools in Scotland, OECD / PEB Evaluating Quality in Educational Facilities. OECD Publishing; 129-34.
- Zimmerman, A., Martin, M. (2001) Post Occupancy Evaluation: Benefits and Barriers, *Building Research & Information*, 29 (1), 168-174.
- Zimring, C. (1987) Evaluation of Designed Environments: Methods for Post Occupancy Evaluation, *Methods in Environmental and Behavioral Research*, New York: Van Nostrand, 270-300.

Potentialities Of The Augmented Reality In The School Manuals Of Primary Education

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Abstract

Today's technologies show unique potentialities in education. How can virtual / physical interweave add value in education? In an attempt to find an answer to this question, we carried out an analytical study that predicts to investigate hypothesis previously elaborated in order to find elements that allow us to verify if the augmented reality can be an added value for the school manual. A focus manual on the study of Portuguese and the environment was taken as a focus. We start from the following hypothesis: application of augmented reality adds value to the textbooks. The study is being prepared to be applied to primary students by trainee students in the context of initial teacher training. In this context, we intend to look at school textbooks, articulating them with the curricular goals and the student profile for the 21st century in order to understand the potentialities of augmented reality. Examples of use are presented. The results confirm our hypothesis and reinforce that the inclusion of augmented reality adds educational value: it promotes methodological renewal by changing the profile of student and teacher in the sense of promoting a connective and circular education with a focus on the student who produces his own knowledge.

Key words: *Augmented reality, Methodological renewal, Initial teacher training.*

Introduction

We grew up with the idea that in the year 2000 the world would end. In reality, the Normal Science that Kuhn (2009) called the phase accepted by the scientific community was broken by the appearance of enigmas that the traditional paradigm could no longer solve. This anomaly of persistent puzzles is giving birth to a new era with projection in the digital world, so we live an era of transition to a new world. In this age, we have not yet been able to detach ourselves from physical elements that were as important in our lives as the physical textbook, but we began to rethink how to transform them. The new generation of children entering or going to school are actually different in their cognitive and emotional characteristics, in the way they live life, in their interests and motivations. Citing several authors, Roberts (2010) defines this generation that has grown up exposed to ICTs and, therefore, experiences skills that make it suitable for the simultaneous use of multimodal digital resources that connects it with the world, as a generation that values the process collaborative learning, often networked, struggling to learn from traditional methods and with a limited one-size-fits-all program.

Effectively, current technology can favor the leap into the new era, for its potentialities and opportunities to develop skills base for current citizenship. But technology is not enough, education professionals are needed with a vision of the future of children's lives, change-conscious professionals and social and economic trends, aware of today's child psychology and innovative experiences in education that have already took place in pilot schools or small niches. It also needs reflective, innovative, creative, enterprising and constructive professionals who reflect on the new methodologies, taking from them ideas to experiment, deduce and recreate, that move towards the mission of contemporary education in line with real life, inclusion of current technologies should provide meaningful learning for the school and for life, in addition to being able to read, write and count. This articulation with life imposes a knowing and being cognitive, emotional, relational and organizational, so there are important skills in this new century as they define the profile of the student (Oliveira-Matins, 2017, OECD, 2005).

In addition, it is in the real relationships between people and facts that learning becomes more meaningful, so that the school should not be limited to its walls but overflow to the world by immersing in it, its problems, anxieties, conflicts, desires and dreams, and emerging with solutions and preventions, knowledge and skills of adaptability, recognition, flexibility, creativity, intellectual and moral autonomy for proactivity in personal, academic and social life. In the latter context, Pascoal (1999), based on several studies by Piaget, reinforces that in the interaction of assimilation with accommodation guided by self-regulation, intellectual autonomy is emphasized, and the child is

not satisfied with a methodology based on memory passive because he feels intellectual curiosity and wants new ways of solving everyday problems, thinks about propositions and not only about the experience provided by concrete objects, raises hypotheses, privileging the formal aspect of thought. Moral autonomy, however, refers to their critical capacity vis-a-vis situations, becoming aware of decisions, of respect for the other.

In this scenario, the textbook can be a limiting element of education if the teacher does not release his / her potentialities through active methodologies and resources that enhance value creation in education to train citizens capable of producing creative ideas, not just repeat what is written by other generations, in other contexts. There is, therefore, a need to open spaces for the student to affirm his / her change of interaction with the environment, developing problem solving skills to produce knowledge, that is, to move from the concrete intelligence that interacts in the real to a formal structure, the content, knowledge (idem).

When looking at the primary school textbook, there is a physical and digital model. Both models respond to the logic of the press culture characterized by packaging information, ideas and organized knowledge and assume a standardized curriculum development model and in mass, that is, reveal six characteristic challenges of the twentieth century: model of expository and receptive teaching, material structured and self-sufficient for curriculum development, cultural industry product packaging, cultural object of press technology, encyclopaedist organization of knowledge, resources mediator between official curriculum and educational practices (Area, 2017). However, in Portugal the model in digital format, despite being a replica of the previous one, already begins to give the first signs of change: it allows access to an avatar with information, in the case of the Portuguese area, for example, grammatical, text structure, with access to PowerPoint and interactive fiches that can be stored in the platform or in the student's own folder; in the case of the Mathematics manual there is the possibility of performing interactive exercises with possibility of correction and conclusive information; Media Study allows you to access interactive content exploration and explanatory PowerPoint images. This fact, compared to the framework of a few years ago (Quadros-Flores, Ramos & Escola, 2015), shows a positive evolution, but still does not allow the student's collaboration in the manual itself which remains closed in its contents and possibilities, despite of interactivity with a view to consolidating knowledge. Some authors point out the importance of interactivity as a determining factor in learning Matas (2011) the need for the living book, which facilitates the updating, that includes tools that allow the student to collaborate, be multimedia and interactive and foster a free navigation through hypermedia Adell (2007), which has social life, which is dynamic Vershbow (2006). This view of the book can be associated with the school handbook by showing more the process of construction in time, open and flexible, adaptable to the group of students and the educational network that becomes active, than the finished, static, closed and limited product.

In Portugal there are platforms that complement the primary school textbook, namely the Virtual School (Porto Editora group) and 20th Digital Classrooms (e-LeYa group) and, according to Quadros-Flores, Ramos and Escola (2015), they rely on pillars in which they aim to improve the results of the children: the organization of the work of the teacher in the level of the planning of classes, of the group and of the work accomplished and evaluation tests; support to the teacher and student through multimedia resources that stimulate vision, hearing and interaction, such as animations, playful and interactive activities, videos, games and concept maps; communication between peers and teachers, chat, forum and sending documents / classes built; other features outside the platform. They amplify the potentialities of the textbook, so the authors (idem) show that they represent the first phase of change in the textbook. For Area (2017) the change lies in the crossing of different areas: in the artifactual or technological dimension, teaching and student functionality, in the processes (pedagogical object) of production, distribution and consumption.

In this evolutionary process, we arrive at Augmented Reality (AR) as a didactic resource that encourages more radical changes in the school manual and, consequently, a change in the child's attitude towards the learning process, a change in the teacher's attitude towards the opportunities of development of skills in the child, more pronounced methodological change, change in the opening of the school to the world and the world to school. It is emphasized that augmented reality can be a driver of the shift from the traditional model to the creation of a dynamic, open, personalized, daring learning model in creation and production, collaboration and network learning, focusing the learning process on the child. According to Matthioudaki and Ioannidou (2018), augmented reality is very promising in improving the teaching and learning process, since it allows learning beyond the curricular boundaries, redefining space, time and resources and that benefits the learning environment as it increases flexibility and interaction in learning activities by ensuring continuous learning. It also promotes immediate access to a range of relevant, collected and shared information from different applications (Yang & Yuen, 2012). In fact, the AR, by allowing the interactive interface of elements of the world with virtual environments (Cobo & Moravec, 2011) and simultaneous exercises in real time, captures the child's full attention in the learning process, facilitates the understanding of the world and things, promotes ubiquitous learning with

stimuli of immediate interaction and moments of decision. Downey (2016) proposes a multiplicity of possibilities for the use of AR in art, architecture, safety, sports, education, medicine, advertising, transportation, and other domains, showing that AR has potential not only in the learning, but also in the daily life of individuals.

This article presents a critical and reflexive thought about the potentialities of augmented reality in education, namely in the school manual. It aims to present augmented reality tools that can be an asset in the use of the school manual, reflect on its potential, and exemplify how the virtual / physical interweave adds value in education.

Methodology

An analytical study was designed to investigate hypotheses previously elaborated in order to find examples of augmented reality that could be an added value in education. The textbook of different curricular areas was taken as the focus of the exposition. We start from the following hypothesis: application of augmented reality adds value to school textbooks by allowing (1) child participation, (2) integration of other resources by teacher and by the student (3) involvement of other education actors the real and contextual world, (5) the development of skills other than curricular (6) curricular articulation (7) methodological change. We reinforce that the study is being prepared to be applied to primary students by trainee students in the context of initial teacher education

Thus, in this article we suggest some AR tools and possibilities of articulation with different curricular areas in the primary education (a). We also present some practical examples of use in the school manual, as well as experiences already used in real context (b) by trainee students in the context of initial teacher training, Supervised Pedagogical Practice.

Findings

(a) Augmented reality as a regenerative potential of curricular and contextual integration

The Order of the Ministry of Education 5908/2017 reinforces curricular flexibility as a means of promoting quality education, that is, it encourages effective and meaningful learning, which stimulates the consolidation of knowledge and its mobilization in concrete situations in order to foster a successful citizenship in the context of the challenges of contemporary society. It is also in this context that the need to develop competences designed in the student profile (Oliveira Martins, 2017) is framed in a transdisciplinary educational environment that involves not only curricular knowledge, but also abilities, attitudes and values. Thus, it is expected that the student who develops scientific knowledge in the curricular areas, acquire cultural and artistic training, possessing empathic capacity, critical thinking, communication, creativity, autonomy and intellectual, moral maturity, intervention and digital literacy, that is capable of integrating knowledge, solving problems, mastering different scientific and technical languages, cooperating and collaborating and having aesthetic sensibility. In this context, AR assumes a relevant potential for the development and implementation of innovative teaching approaches, namely the ability to research, analyze, understand, select, integrate, argue, produce and share. Surfing on the Internet we can get free applications that require only a *Smartphone* or *Tablet* with *Wi-Fi* connection and that reveal potential for change in education. Taking into account the curricular contents of the primary education, table 1 presents some examples of potential use of augmented reality in educational context.

Table 1: AR as a regenerative potential of curricular and contextual integration

Pokémon Go	The search for little monsters through the streets of the city, the neighborhood or in the school space, can provide a visit to the city: its monuments, gastronomy, culture..., while at the same time highlighting dangers, safety signs, community intervention projects, multiple public and private institutions, urban media, community spaces, commerce and institutions, comparisons with twinned cities... that could be the input of debates, the realization of intervention projects for the encounter of local solutions, study of geography and history, use of maps and their recreation, of posters and infographics, being able to stimulate the reading of texts, of works, news and the recreation of these in books online. In addition, it can awaken the study of distances, the design of angles, geometric figures, estimates and costs. Looking to the nearest space, the neighborhood and the school, triggers the deeper knowledge of the place stimulating positive interrelations with the school community that the game itself promotes in articulation with the areas of physical and motor expression, dramatization, plastic arts and music. In addition, in the interaction game there is space for developing the foreign language.
AR Dragon	The possibility of feeding your pet can provide a reflection on the food: what foods, how to cook, hygiene care, food validity, table presentation, meals, causes and effects of healthy / unhealthy eating, estimates, article reads and post-sharing text writing. It also allows the

	knowledge of self and others to draw up graphs and to carry out objective, coherent and communicable analyzes that promote the development of the capacity for reflexive and critical reasoning that can give rise to intervention projects with immediate effect on children .
Google translator	The possibility of pointing a smartphone camera to signs, pamphlets, publicity, papers, restaurant menus and immediately accessing the translation can promote the learning of foreign languages.
Quiver	The possibility of digitalizing children's works in printed cards that are acquired on the Internet and of magically giving them life in 3D digital environment, integrating image, movement, audio and interaction, allows the creation of emotions in children and can be articulated with different areas: plastic expression, study of the environment, including history and geography, Portuguese, mathematics and foreign language. The possibility of photographing, or filming the experience of reply to an interactive questionnaire, interacting and playing with the characters, stimulates methodological and playful renewal in learning. It is unfortunate not to allow the user to create the questionnaire. Also, the possibility of deciding, given the choice of the place of visit, allows developing leadership, decision-making, argumentative and critical thinking skills and cooperative work, as well as stimulating project creation and curricular flexibility.
WallaMe and AR Geocaching Game	The possibility of leaving hidden messages anywhere in the world allows contact with the world and its knowledge, its history, geography, culture, nature and society, by which it stimulates contact with the world, thus the development of language and communication, consequently promotes reading and writing, the ability to question, digital literacy, mathematics (measures of greatness, money, and other essential mathematical instruments in the study of phenomena) the development of culture, communication, geography, creativity .
Qlone	The possibility of scanning an object and inserting it in 3D form opens the child to complete their manual with real-life things with materials they have built in the area of plastic expression, musical, mathematical, and science.
Aurasma Reveal	- Viewing videos and images overlapping the physical element allows you to pinpoint objects and respond to gestures interacting with virtual objects. In this way, it stimulates the creativity of the child and the teacher in order to demonstrate how they understand the world, or the content to be dealt with in the school manual, promoting the articulation and curricular flexibility, the development of collaborative projects.
QrCode	The ability to create two-dimensional barcodes, easily digitized and transformed, alters the way the child interacts with the world and broadens the possibilities for dialogue of contents and curricular areas, materials, interlocutors in education, customization and methodologies.

This table with AR tools shows the possibility of a new era of the school manual in a new educational scenario where learning has meaning and can provoke emotions. By deflating the traditional orientation from the simple to the complex, in a line of clear continuity from successive stages to an end, new openings are possible that, according to the pertinence of the content, mix the capacity to understand and to realize it, of the interest and comprehensiveness of the curiosity, creative and entrepreneurial capacity and organization of educational practices in the sense of promoting opportunities for student growth, always bearing in mind the expected objectives / competences in the respective year of schooling. In a transdisciplinary environment it is possible to associate active methodologies focused on the student and the learning process stimulating their involvement and commitment, the motivation and the desire to improve, therefore the satisfaction. Examples of active methodologies are *Gamification, the Flipped Classroom, project-based and problem-based learning, and peer-to-peer learning.*

(b) The augmented reality experienced in real schools in a context of internship in the initial formation of teachers: experiences and results

In the context of initial teacher training, in an internship situation, future teachers applied AR tools in their

educational practices. It was verified the enthusiasm of some in the organization of the lesson plan, but also the technical difficulty of others in the use of the tool. By stimulating the institutional supervisor of the student trainee creativity, some fantastic successful experiments were possible not only because they promoted enthusiasm and emotion in the trainee student, cooperating teacher and children, but also because it surpassed the imagination of the various educational actors, having immediate effects on satisfaction of children and learning outcomes. Here are some concrete examples with evidence:

- (1) The child had access to the printed sheet of Quiver and colored the images and interacted through the program (Figure 1). Listening to the sound of the plane and watching it fly in space you can select cities to visit. The course is recorded and inserted in the school manual through the *Aurasma*. It motivates the development of the theme "media" in the study of the environment in articulation with the development of skills of the student profile. Wanting to extend the approach, for a matter of time, was not possible, a project was then developed on cities and their cultures, tourism and globalization. Depending on the level of education and guided in a *WebQuest* articulated with Google Drive (as a collective repository of the class), children can access brochures from a travel agency, for example *eDreams* learning to book trips and being aware of their values, *Google Earth*, to *Youtube* by selecting videos that help you understand the topic you are studying. They can access texts, books, news, music, relevant document sources and integrate all the information collected in *QR Codes* that will be attached to the school manual. They can also take artistic forms, in appropriate applications, compile the information into keywords, or into a concept map. Working collaboratively, an online book with the tasks performed by the various groups is attached to the school handbook using *QR Code* or *Aurasma*. These tasks should be performed by children.



Figure 1 Activity with Quiver

- (2) The child selects a video on *YouTube* and integrates it into their manual using *QR Code*, but can share it with their colleagues. Provides a *QR Code* to your colleagues to voluntarily decide whether or not to attach to your manual (Figure 2). The trainee student integrated questions to stimulate understanding of the text and a knowledge verification / consolidation quiz. Also these features can easily be shared with the pairs (Figure 3). Eventually the tendency of the publishers will be to assume this hybrid possibility of school textbooks by providing resources through AR. If this happens, it will be a good help to the teacher by freeing him or her for other tasks. However, the teacher should also add resources and guidelines made by him / herself and appropriate to the class and, above all, open spaces for children's collaboration in school textbooks, giving them the opportunity to customize them for the children and other actors they select. They are the children who must research, select, add, connect, produce and, if possible, share.



Figure 2 Integration of QrCode by the student



Figure 3 Integration of QrCode by the student

- (3) During the experimental science class, where the child used different soil samples to verify their permeability, each had the opportunity to access information and challenges through AR (Figure 4). This information and the activities they have performed in response to the challenges can be attached to the middle school textbook. After the children learn how to use the technology (*Aurasma / Reveal*) they can search, according to their interest, need and rhythm, can create text or book online, include in their school manual using AR by customizing it.



Figure 4 Access to information during class

- (4) The school manual itself served as the basis for this activity through the tongue-and-groove "The sink and the kite" (Figure 5). In this specific case it was the trainee student who, for a better understanding of the text, integrated movement (drip fell from the sink to the chick's beak), and video (the birth of the chick). There are two essential points in the process of learning, meaning and emotion that have been experienced in this experience. The children and the cooperating teacher were fascinated. The children were able to develop creativity in the field of orality, imagining the sink and water drip, what the chick felt, what the function of the sink, why it drips in the sink and what happens to the water drip when it enters the chick's beak. They were able to write a registration form by completing the character's balloons and a tongue-and-groove that was played through *incredibox.com*. All this can be attached to the manual through AR. By observing the birth of the chick, they can articulate the knowledge of the Study of the Middle by creating a research project: how birds are born, incubation of eggs in the hen (time / duration), growth of the chick until it is rooster, physical characteristics, mobility, reproduction; of mathematics: estimates, measures of length and time, masses, money, representations of sets and data. Children should learn to use AR resources to freely use at school or at home. The collection of information on the subject studied may be free or oriented, but it is important that they select the best resources, arguing the decision,

to be attached to the school handbook. Example of this suggestion is to access the AR through her selecting and interacting with character, in this case an animal (Figure 6)



Figure 5 Access to a video and water drip movement from the sink. Figure 6 Access to animals through AR

- (5) In this activity, in an environment of discovery and collaborative way, the children observed and felt, touching the rocks and registered their characteristics. Each group showed to the others, what they learned by stimulating dialogue and scientific foundation, and the presentations were recorded. The children learned to use the AR application, integrated the videos in the school manual, or registration forms, and held a final debate on the topic of critical and argumentative thinking (Figure 7). It is important to leave open possibilities for children to recreate!



Figure 7 Integration of a video, made by the children, related to the work developed

Conclusions

In an "augmented" world, reality merges with digital objects immediately, interactively, and in three dimensions. This overlapping of virtual information to the physical elements of the world, such as the case of the school manual, when and where we want, changes the way we learn, what we learn, when and where we learn, articulates the formal and the informal, the playful as a didactic tool and develops digital literacy skills among other transversal and fundamental competences in the contemporary world. In addition, it changes the attitude and connections with the world, by which it alters the student profile: collaborator in the construction of didactic resources, in an individual and collaborative way, critical and creative entrepreneur, self-regulator of learning, responsible. In this environment, learning becomes increasingly social and organic, seen as transformative.

Learning to learn in a more open social model, where challenges open paths to groups and individuals, and these travels driven by common and individual interests and objectives, in the most varied directions, presupposes growing up in an environment of connections where children reveal the interpretation which have on the curricular content studied through selection of added resources, this selection being the mirror of the construction of their world, reflecting their emotions and sensitivities. Knowledge is thus a process built in an environment where the child moves with dynamism and interaction, mobilizing theory in practice accompanied by reflexive processes.

If one day the AR is able to integrate a multiplicity of technological equipment, we can talk about sustainable circular education. Given that we are in a transition period, it seems to us, however, that this connectivist tendency (George Siemens, 2005) must be accompanied by the teacher's attention to converge with the objectives for the year of schooling, since the chance encounter of selections pedagogy for children can lead to the dispersion and difficulty of understanding and building meaningful learning. Thus, the teacher assumes a fundamental role in the selection of technologies and methodologies that promote the development of thought and interaction, guiding the child in his / her growth process and understanding of the world, of himself and others, helping to think critically, produce and share knowledge and resources in the sense of connectivity, creativity and circularity.

This study confirms that AR encourages the participation of the child, teacher and other actors in textbooks and interaction with the real and contextual world, which promotes curricular flexibility. In fact, AR has the potential to change the pedagogical action of the school manual to the level of transmission, the organization of units and sequences of learning, transforming the physical school manual, as we now conceive it, as it overlaps the digital, adding value to the process of construction and recognition of knowledge patterns, the possibility of developing skills and evaluation parameters, revealing that it is a process to be developed rather than a tool to be applied in relation to digital technologies, as Castells (2000) states. Thus, it requires the teacher creativity to find diversified strategies and opportunities that respond to the needs and interests of the students and that expand spaces and moments of learning of the children for the children.

This scenario differs from the image of education 1.0, very artisanal, of 2.0 already more collaborative, approaching 3.0 where the recognition of change is a reality that imposes proactivity of the educational agents to a circular education focusing on the child who produces the information it needs. This educational sustainability favors the adaptability to the student's environment and autonomy. As a conclusion, augmented reality promises profound changes that make the manual innovative: it changes the possibility of the learning structure according to the child and the context, so the static, limited, transmissive school manual becomes more open, comprehensive, questioning, interactive and shared; it changes the possibility of more distributed and connective and less organized articulation; changes the opening of the book and the ways of teaching to learn to learn, more constructivist and collaborator, by which changes the profile of the student, teacher and learning methodologies and adds the possibility of developing skills and emotions in the learning process.

References

- Adell, J. 2007. O livro de texto do futuro. *Revista Galega de Educación*, 38, 9-15.
- Castells, M. (2000). *A Sociedade em Rede*. S. Paulo: Edições Paz e Terra.
- Cobo, C. & Moravec, J.W. (2011). *Aprendizaje invisible. Hacia una nueva ecología de la educación*. Barcelona: Universitat de Barcelona. Available: <https://www2.educationfutures.com/books/aprendizajeinvisible/en/>
- Downey, S. (2016). *The Gigantic List of Augmented Reality Use Cases*. Available: <https://uploadvr.com/augmented-reality-use-cases-list/>
- Kuhn, T. (2009). *A Estrutura das Revoluções Científicas*. Lisboa: Editora Guerra & Paz.
- Matas, M. (2011). *A next-generation digital book*. Available: http://www.ted.com/talks/lang/en/mike_matas.html.
- Matthioudaki, O. & Ioannidou, K. (2018). Augmented reality in education: introducing the tool Aurasma in a hybrid learning context to increase Learner autonomy and motivation. In *Proceedings of INTED2018Conference* (pp. 1364-1373). Valencia: INTED.
- Pascual, J. (1999). Autonomia intelectual e moral como finalidade da educação contemporânea. *Psicologia, Ciência e Profissão* 19 (3), 2-11.
- Roberts, R. (2010). The Digital Generation and Web 2.0: E-Learning Concern or Media Myth? In Yang, H., & Yuen, S. (Eds.). *Handbook of Research on Practices and Outcomes in E-Learning: Issues and Trends* (pp. 93-115). Hershey, PA: IGI Global. DOI: 10.4018/978-1-60566-788-1.ch006.
- Siemens, G. (2005). Connectivism: A learning theory for the digital age. *International Journal of Instructional Technology and Distance Learning*, 2(1), 3-10.
- Szymczyk T., Skulimowski S., The use of virtual and augmented reality in the teaching process. In *Proceedings of INTED 2017, 11th International Technology, Education and Development Conference* (pp. 6570-6577). Valencia: IATEDAcademy.
- VERSHBOW, B. (2006). *Defining the networked book: a few thoughts and a list. If: book -A project of The Institute of the future of de Book*. Available: http://www.futureofthebook.org/blog/archives/2006/05/defining_the_networked_book_a.html
- Yang, H.H., & Yuen, S. C-Y (Eds.) (2012). *Handbook of Research on Practices and Outcomes in Virtual Worlds and Environments*. Hershey, PA, USA: IGI Global. doi:10.4018/978-1-60960-762-3.

Practical Examples From Economics And Security For Motivation Purposes In The Tuition Of Single Variable Calculus At The Start Of Studies At University

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Abstract

In this paper, the authors try to find answers to questions relating to the selection of solved examples from the Single Variable Calculus field that could evoke positive motivation in students of economic and security disciplines at universities in their studies of Mathematical subjects. They concern the dependency of the selection of examples with respect to the timing of their presentation in the tuition process; at the same time, as the question of the adequacy of these examples with respect to the students' level of knowledge in their first year of studies. At the end of the article, some demonstration examples are mentioned, which contain Single Variable Calculus applications that require a knowledge of only the most basic parts of the given subject matter. Therefore, these not-too-difficult examples can be used - as the authors hope, for the eventual interest of other users at other universities with Engineering disciplines.

Keywords: *Mathematics tuition, motivation to study, Single Variable Calculus, examples, universities with Engineering disciplines*

Introduction

When selecting a sample of solved examples for this contribution, we were aware that each selection of such examples is a subjective matter. Nevertheless, we shall present some experiences that could - despite the subjectivity of the selecting examples, contribute both to the quality of the afore-mentioned examples as well as to the well-timed motivation of students to study mathematics.

The greatest advantage of the selected sample examples, where complex mathematical tools are not used, and which - at the same time, are a bridge between mathematics and the specialist subject matter is that these examples can be used in the early stage of mathematics lessons, or at the beginning of a certain mathematical topic. When motivation does not take place in time, it will lose much of its effect. The proper and immediate understanding of mathematical application examples will also make a significant contribution to increasing the self-esteem of some less gifted students.

It is also important to have the widest variety of samples which motivate an understanding of the solved examples - both in terms of the content of specialized topics, and the range of mathematical or geometric skills used.

Feedback can certainly help to reduce the subjectivity of the selected examples chosen by the teacher. In order to acquire these skills, it is necessary to do several research surveys in the tuition process whereby students will evaluate individual examples.

Now, let's mention a few experiences that can contribute to the quality of the form of the text. The mathematicians concerned should consistently use a valid international standard (International Standard ISO 80000-2: 2009); which defines the writing of mathematical symbols in the examples and all the lessons, and which is always implemented in individual national standards. Experience to-date, has shown that many mathematicians do not use these standards consistently when writing mathematical teaching texts. The excuse for this fact can certainly not be that every editorial office of mathematical or other journals has its own requirements for writing texts with mathematical symbols - which are often determined by tradition.

Each figure should have its own concise description of the situation which it displays. Coordinate axes - and in particular, coordinate axes in three-dimensional space, should be oriented such that they should be ended with arrows. This should also - where possible, be if it is a graphical output from a computer algebraic system (e.g. Maple, Matlab, Mathematica, etc.), and the figure needs to be completed by using other software.

In this sample of presented and solved examples, each example has its concise name with the use of keywords, which are clearly highlighted in *Italics*. The example name contains and highlights those key mathematical terms that are applied, as well as those highlighted technical terms that must be used in the particular example. Thus, the example name represents a certain abstract of the whole example and is valuable both for the better orientation of the teacher and that of the student.

If it is necessary to explain some of the technical terms, then it is advisable to do so immediately after setting out the example, and to place these explanations in the marked remarks. It is sometimes useful to summarize the result obtained in the example.

Although some examples can be very closely related to each other, it is prudent to try to formulate them from the start - in a relatively independent way. For future changes to the sample examples, it may be helpful not to use references to other examples in the text.

Experienced educators, including the authors of this contribution, do not consider the presented sample of solved examples as being definitive. The authors are convinced that attractively formulated solved examples – with the right timing, will always “spice-up” the tuition process.

The Study

Nowadays, Single Variable Calculus is a classic mathematics teaching topic in most of the final years of secondary schools. In this teaching text, the central concept is the limit of function. Euclides of Alexandria, ($\pm 365 - \pm 300$ BC); and in particular, Archimedes of Syracuse, (287-212 BC), used the limit of function in a simple form. The limit of function - as the most basic concept of mathematical analysis, was defined in the 17th Century by the Englishman, John Wallis, (1616-1703); but it was not until the Czech mathematician and persecuted philosopher and priest - Bernard Bolzano, (1781-1848), the Frenchman, Augustin Luis Cauchy (1789-1857), and the German, Karl Weierstrass, - 1897), who introduced the concept of Limit consistently into mathematics. Without limits, is hard to imagine teaching mathematics today. But, understanding the concept of the limit is a rather difficult issue.

The first example in this paper is also devoted to applying limit processes to derive a formula for continuous interest rates, which is to say, the limit of the Compound Interest Rate. The term “Derivative” can be very naturally explained by the limits of functions. The first - and higher derivative of function allow one to solve problems with searches for the maximum or minimum of a function; the so-called Extremal Problems. The solution of these problems makes it possible to optimize many processes from the engineering practice field.

The second example deals with the application of the derivation of a certain function to solve the extremal problem of the maximum profit calculation.

In the third example, the necessary condition of the local extreme of a certain function is applied to minimize the cost of building a road connection to a railway line so that the connection is directed under the optimum angle. In the fourth example, a Cosine Theorem - known from secondary school geometry lessons is applied, and the necessary condition of the local extreme of the function of one variable is used to calculate the optimal distance such that the observer is able to register/see the vertical image at the maximum angle. This is a situation that can be solved in security situations - where the observer is an explorer. The example is also interesting in that it also demonstrates in the figure showing a graph of certain functions, the relationship of the Arithmetic and Geometric Means of two values.

The fifth - and final example, is the application of the “Per Partes” method in an Indefinite Integral to derive the function of the total income, and hence - to determine the Demand Function; which, when applied to the limit at the plus infinity (improper) point $+\infty$, thus easily enables one to confirm the fact that the demand rapidly decreases with the quantity of products sold. This example is useful for teaching for many reasons. Especially because the “Per Partes” method is uncomplicated and is often discussed in the last years of secondary schools. Mathematicians know that this method very often also solves very complicated problems; for example from applications where mathematical physics equations are present - for which, advanced functional analysis procedures are needed.

In this example, there are functions that also contain Exponential Function. And it is up to the student’s ability to control the derivation and integration operations of such functions at universities where great emphasis on such matters. The reason is that the exponential course, or a course that is very close to it, has a large number of natural and social laws. At the end of the example, the notion of limits is used to demonstrate that - as noted above, demand decreases in dependence with respect to the growing quantity of the products sold. This conclusion of the example is a nice interconnection of Integral Calculus with the Limit, as the basic concept of the differential calculus of functions of one variable.

Note that in this article - as well as in the teaching process, we consistently use a valid international standard for writing mathematical symbols - (International Standard ISO 80000-2: 2009). In the Czech Republic, this is the national standard - (Czech Standard ISO 80000-2: 2012).

Findings–Main Results–Sample Solved Motivational Single Variable Calculus Examples

Example

The *Limit Process* application, and the use of the well-known definition of the *Euler Number* as the limit for the derivation of *Continuous Interest* - as the limit of the *Compound Interest Rate*

Derive the formula for *Compound Interest rates*, which are mainly used in theoretical financial models; you know that the extreme case (limit) of the Compound Interest rate described - including its formula in another case, where the *interest rate frequency* indicates how many times the interest is credited to a year, grows unboundedly; in other words, an unlimited short *interest rate period* also corresponds to the unlimitedly low *interest rate*. Abstract this from the *Withheld Interest Tax*.

Solution

Compound interests, when ignoring the withholding interest tax, is described by the formula

$$K_n = K_0 \cdot \left(1 + \frac{i}{m}\right)^n,$$

in which K_n is the amount payable, K_0 is the principal, i is the rate p. a., and n is the capital deposit period in years.

Now let us move on to the compound interest rate limit for $m \rightarrow +\infty$. For a period of n years, the interest is credited a number of times $m \cdot n$, in other words - the number of *interest periods* is now $m \cdot n$, since - in each of the n periods, there is another m period; i.e. the *limit process* leads to a formula describing *continuous interest*

$$K_n = \lim_{m \rightarrow +\infty} K_0 \cdot \left(1 + \frac{i}{m}\right)^{m \cdot n} = K_0 \cdot \lim_{m \rightarrow +\infty} \left[\left(1 + \frac{1}{\frac{m}{i}}\right)^{\frac{m}{i}} \right]^{i \cdot n} = K_0 \cdot \left[\lim_{\frac{m}{i} \rightarrow +\infty} \left(1 + \frac{1}{\frac{m}{i}}\right)^{\frac{m}{i}} \right]^{i \cdot n},$$

$$K_n = K_0 \cdot e^{i \cdot n},$$

where we use the defining equality for e

$$e := \lim_{x \rightarrow +\infty} \left(1 + \frac{1}{x}\right)^x.$$

In conclusion, let us note that the continuous interest rate is even more advantageous for depositors than compound interest is; whose special case is - that even though the strength of continuous interest is only manifested by interest rates of several tens of percent per year.

Example 2

The application of the *Derivative of Function Concept* to the solution of *Extremal Problems* relating to the *Maximum Profit Calculation*

A car rental centre has 50 passenger cars. Long-term observation has discovered that, in the course of the daily rental of one car for 30 €, it achieves full daily rental and every increase of rent of 1.5 € causes a decrement of interest in one car. Evaluate the car hire price, such that the firm's profit is maximised, if the new calculated price of car hire service is 3.- € per car on the daily overhead costs.

Solution

When x indicates the number of rented cars, then $50 - x$ cars remain untapped daily, as a result of increased rent by $1.5 \cdot (50 - x)$. Then, the daily rental income is equal to

$$P(x) = (30 + 1.5 \cdot (50 - x)) \cdot x - 3x = 102x - 1.5x^2. \tag{1}$$

The quadratic function $P(x)$, represented here by the parabola open against the (positive) direction of the axis Oy , has only one local, (and global), maximum at the critical point x_0 ; for which it is valid:

$$P'(x_0) = 102 - 3x_0 = 0 \Rightarrow x_0 = 34.$$

The increased rent of $1.5 \cdot (50 - 34) = 24.-$ €; that is, 54.- € per car; which gives a maximum daily profit of $P(34) = 1\,734.-$ €. from the daily rental of 34 cars.

In conclusion, let us note that the calculated value of 1 734 can also be obtained from (1), after modifying the quadratic expression to its "square" - (second power), known from secondary school mathematics. Then, it is valid that:

$$P(x) = -\frac{3}{2} \cdot x^2 + 102 \cdot x =$$

$$\begin{aligned}
 &= -\frac{3}{2} \left[x^2 - 2 \cdot \left(\frac{102}{3}\right) \cdot x + \left(\frac{102}{3}\right)^2 - \left(\frac{102}{3}\right)^2 \right] = \\
 &= -\frac{3}{2} \left(x - \frac{102}{3} \right)^2 - \frac{3}{2} \left(\frac{102}{3} \right)^2 \\
 P(x) &= -\frac{3}{2} \cdot (x - 34)^2 + 1734,
 \end{aligned}$$

so the parabola has its peak at the point $V = (34, 1734)$.

Example 3

The application of angular properties in adjacent triangles, expressed by goniometric functions and cyclometric functions, including the application of the *Local Minimum Necessary Condition* of the function of one variable to calculate the mathematical condition that guarantees the *Minimum economic Costs* necessary to make a direct road-connection to the railway line that runs from the city - which rail does not pass through, at an *Optimum Angle*; if the ratio of road transport costs to the cost of rail is known.

Not far from Company A, the railway should run along a straight line to B. At what angle α to the railway line is it necessary to design a straight road from A, to make transport from A to B as low as possible, if the long-term rate for road transport is $1t/km$, as compared to rail m more times expensive?

Solution

The situation is described by the following figure

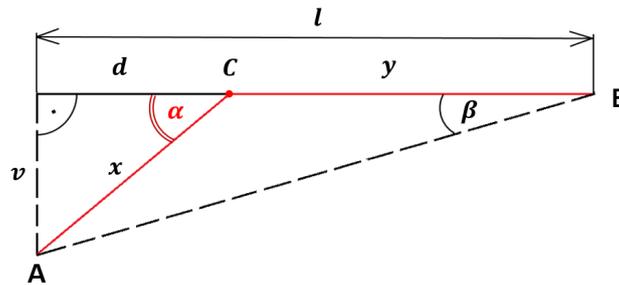


Figure 1 Finding the optimal angle of the road link to the railway line

Let n be the cost of transport by rail, p total cost, while v, l are constants. Then, it is valid that

$$\frac{v}{x} = \sin \alpha \Rightarrow x = \frac{v}{\sin \alpha}, y = l - d = l - v \cot \alpha,$$

so

$$p = m n x + n \cdot (l - d) = m n v \cdot \frac{1}{\sin \alpha} + n \cdot (l - v \cot \alpha).$$

The *Necessary* condition for the local *Extremum* of function $p(\alpha)$ gives

$$p'(\alpha) = -m n v \cdot \frac{\cos \alpha}{\sin^2 \alpha} + n \cdot (-v) \cdot \left(-\frac{1}{\sin^2 \alpha} \right) = 0 \Rightarrow -m n v \cdot \cos \alpha + n v = 0 \Rightarrow$$

where

$$\cos \alpha = \frac{1}{m}, \text{ kde } 1 < m. \tag{1}$$

From this, we obtain the *Stationary Point* of the function $p(\alpha)$, which is the sought angle

$$\alpha = \arccos \frac{1}{m}, \tag{2}$$

and that, under the following conditions

$$\cos \alpha = \frac{1}{m} < \cos \beta = \frac{l}{AB}$$

that is to say, under these conditions

$$\frac{l}{AB} < \frac{1}{m}, \tag{3}$$

Where l is the size of the perpendicular projection of the connecting road AB between Cities A and B in the direction of the railway line passing through City B.

It can be shown that $p''(\alpha) > 0$, i.e. the **total cost** $p(\alpha)$ is a function everywhere where $(0 < \alpha < \frac{\pi}{2})$ is **convex** and **minimal** for $\cos \alpha = \frac{1}{m}$..

Namely

$$p''(\alpha) = -m \cdot n \cdot v \cdot \frac{-\sin^3 \alpha - 2 \cos^2 \alpha \cdot \sin \alpha}{\sin^4 \alpha} - 2n \cdot v \cdot \sin^{-3} \alpha.$$

If we insert input from relation (1) here, we get - after a simple modification, the following relations

$$p''(\alpha(m)) = n \cdot v \cdot \frac{m^3}{\sqrt{m^2 - 1}} > 0.$$

Example 4

The application of the Cosine Theorem and the Necessary conditions for the existence of the Local Extreme function of one variable on the calculation of the Optimal Distance in which the robot is to be stopped in order to scan the height of the image of the vertical wall, under the greatest angle.

Determine the distance that the robot has to stop in order to scan the height of the image on the vertical wall at a maximum angle; if the upper, respectively, the lower edge of the image is by the value of a – or respectively, the value of b is higher than the robot’s optical sensor.

Solution

The situation is illustrated in the following figure

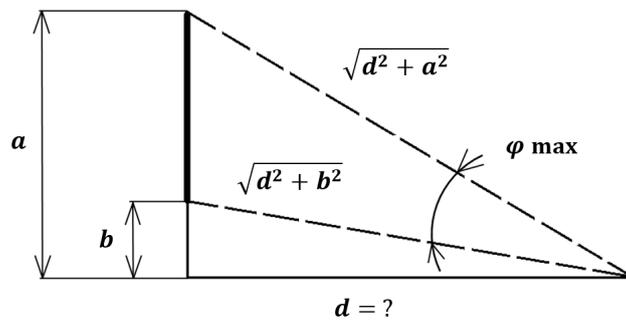


Figure 2 Investigation of the maximum scanning angle of a vertical figure, depending on the distance of the figure

From the Cosine Theorem for a triangle with sides a, b, c - known from secondary school mathematics,

$$c^2 = a^2 + b^2 - 2ab \cdot \cos \gamma$$

we get

$$(a - b)^2 = (d^2 + a^2) + (d^2 + b^2) - 2\sqrt{(d^2 + a^2) \cdot (d^2 + b^2)} \cdot \cos \varphi.$$

Let us denote

$$y(d) = \cos \varphi = \frac{d^2 + ab}{\sqrt{(d^2 + a^2) \cdot (d^2 + b^2)}},$$

where this dependence is expressed in the following figure (obtained from the Matlab computer algebra system).

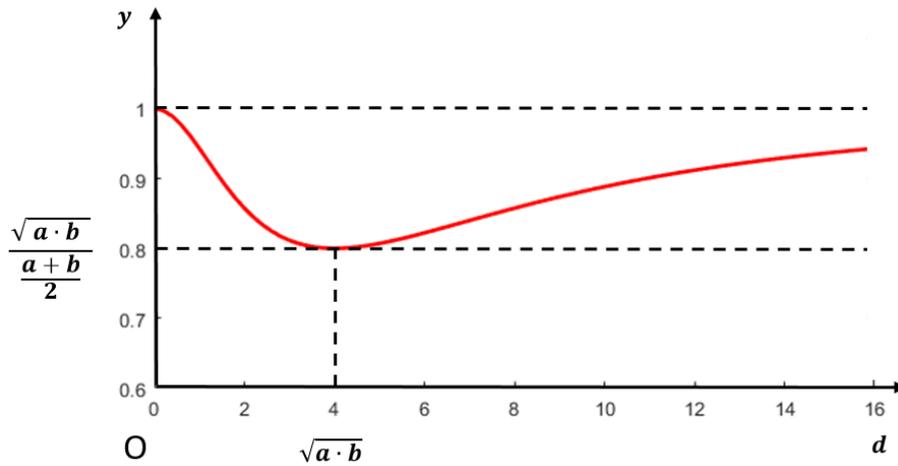


Figure 3 The graph of the dependence of scanned angle size, (given by the cosine function), with respect to the scan distance at $a = 8, b = 2$

From the geometrical essence of the task, it is obvious that the angle attains its maximum - and this is only once. Therefore, it is sufficient to use the necessary condition for its existence; which is the zero value of the derivative of the following function:

$$y'(d) = \frac{2d\sqrt{(d^2 + a^2) \cdot (d^2 + b^2)} - (d^2 + ab) \cdot \frac{d(2d^2 + a^2 + b^2)}{\sqrt{(d^2 + a^2) \cdot (d^2 + b^2)}}}{(d^2 + a^2) \cdot (d^2 + b^2)} = 0$$

$$= \frac{2d(d^2 + a^2) \cdot (d^2 + b^2) - (d^2 + ab) \cdot d(2d^2 + a^2 + b^2)}{[(d^2 + a^2) \cdot (d^2 + b^2)]^{\frac{3}{2}}} = 0$$

Therefore, after the rearrangement of the last fraction numerator, the following equalities must hold for the nullity of that numerator.

$$\underbrace{(a - b)^2}_{> 0} \cdot (d^2 - ab) = 0 \Rightarrow d = \sqrt{a \cdot b}$$

Conclusion

The robot must stop at a distance that is equal to the geometric mean (centre) of the two values a and b ; and it can be deduced that the corresponding value in this distance $y = \cos \varphi$, is given by the ratio of the geometric mean $\sqrt{a \cdot b}$ to the arithmetic mean $(a + b)/2$.

Example 5

The application of the “Per Partes” method in an Indefinite integral in order to derive the function of the Total Income - and from it, to then deduce the Demand function, from which it can be confirmed by the application of the Limit at the plus infinity (improper) point, that demand rapidly decreases with the quantity of products sold.

Find the function of Total Revenue $T_R(x)$ and Demand Function $d(x)$, if the Marginal Income function is $M_R(x)$; where x is the number of products, is given by the relation:

$$M_R(x) = \left(2 - \frac{x}{50}\right) e^{-\frac{x}{4}}$$

Solution

The Total Revenue function holds

$$T_R(x) = \int M_R(x) dx$$

After insertion, we will get

$$T_R(x) = \int \left(2 - \frac{x}{50}\right) e^{-\frac{x}{4}} dx = \left(2 - \frac{x}{50}\right) \cdot (-4) \cdot e^{-\frac{x}{4}} - \int \left(-\frac{1}{50}\right) \cdot (-4) \cdot e^{-\frac{x}{4}} dx =$$

$$= -8 \cdot e^{-\frac{x}{4}} + \frac{4x}{50} \cdot e^{-\frac{x}{4}} - \left(-\frac{16}{50} \cdot e^{-\frac{x}{4}} + C\right) =$$

$$= \frac{2}{25} \cdot (x - 96) \cdot e^{-\frac{x}{4}} + C$$

Thus, the Total Income function is

$$T_R(x) = \frac{2}{25} \cdot (x - 96) \cdot e^{-\frac{x}{4}} + C \quad (1)$$

In the calculation, we used the “Per Partes” method that we had chosen

$$u = 2 - \frac{x}{50} \quad v' = e^{-\frac{x}{4}}$$

$$u' = \left(0 - \frac{1}{50}\right) \quad v = (-4) \cdot e^{-\frac{x}{4}}$$

We calculate the Integration Constant from Equation (1), in which we replace x by zero - (the zero quantity of products for which we received zero income). The so-called **Initial Condition** for a unique solution then gives:

$$T_R(0) = -\frac{192}{25} + C = 0 \Rightarrow C = \frac{192}{25}$$

The Total Revenue function is

$$T_R(x) = \frac{2}{25} \cdot (x - 96) \cdot e^{-\frac{x}{4}} + \frac{192}{25} \quad (2)$$

We determine the Demand Function $d(x)$ from the relation

$$T_R(x) = x p = x d(x), \quad p - \text{price of product.}$$

From here, we have - for the Demand Function $d(x)$

$$d(x) = \frac{T_R(x)}{x} \quad (3)$$

After substitution of (2) into (3), we derive the demand function $d(x)$ relation

$$d(x) = \frac{1}{x} \cdot \left[\frac{2}{25} \cdot (x - 96) \cdot e^{-\frac{x}{4}} + \frac{192}{25} \right],$$

so

$$d(x) = \frac{2}{25} \cdot \left(1 - \frac{96}{x}\right) \cdot \frac{1}{e^{\frac{x}{4}}} + \frac{192}{25 x}$$

From this, it is obvious here that Demand $d(x)$ decreases rapidly with the number of (sold) products; since

$$\lim_{x \rightarrow +\infty} d(x) = 0.$$

Conclusions

The aim of the article was, apart from the attempt to find answers to some more general questions relating to motivating students to study Mathematics; to show –at the same time, a sample of appropriate uncomplicated examples from the Single Variable Calculus field. The sample of five examples presented herein is primarily intended for students of the first year of the Security and Economics disciplines. Both of these disciplines are studied at Tomas Bata University in Zlín, but the authors believe that these examples can also be used at other universities where Single Variable Calculus is taught; whether in the full-time or combined/distance forms of studies. Of course, these examples can also be used in the appropriate parts of the secondary schools as well. Interest in the study of mathematics can be significantly buttressed the use of effective motivational strategies - these strategies are studied in detail by Posamentier and Krulik, (2011).

The results presented in this paper link to the duly defended Research Project No. 504 of the Ministry of Education, Youth and Sports of the Czech Republic, and the experience gained in writing textbooks, like – for instance - (Fialka, 2008a; Fialka 2008b; Fialka 2008c).

In conclusion, let's recall the well-known pedagogical principle that says that, “better is an example, than mere words”, as follows:

“Verba movent, exempla trahunt”... “Words encourage, examples compel.”

References

- Czech Standard ISO 80000-2: 2012. *Quantities and units – Part 2: Mathematical signs and symbols to be used in the natural sciences and technology.* (in Czech) (64 p.). Prague: The Czech Office for Standards, Metrology and Testing.
- Fialka, M. (2008a). *Differential calculus of several variables with applications.* (in Czech) 3rd ed. (145 p.). Zlín: Tomas Bata University in Zlín.
- Fialka, M. (2008b). *Integral calculus of several variables with applications.* (in Czech) 3rd ed. (103 p.). Zlín: Tomas Bata University in Zlín.
- Fialka, M. (2009). *Mathematics I.* (in Czech) 2nd ed. (107 p.). Zlín: Tomas Bata University in Zlín.
- International Standard ISO 80000-2:2009. *Quantities and units – Part 2: Mathematical signs and symbols to be used in the natural sciences and technology.* (40 p.). Geneva: International Organization for Standardization.
- Posamentier, A.S. & Krulik, S. (2011). *The Art of Motivating Students for Mathematics Instruction.* 1st ed. (128 p.). Practical Guides. London, United States: McGraw-Hill.

Pre-Service Preschool Teachers' Opinions About The Formative Assessment

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Abstract

Formative assessment is based on the principle of determining students' learning needs and teaching them with their needs in mind. The main goal of formative feedback is to strengthen students' knowledge, specific skills, understanding in certain contents, and general skills such as problem solving. The aim of this study is to determine pre-service preschool teachers' opinions about the use of formative assessment. This is a case study, a qualitative research method. This study was conducted with 63 pre-service teachers who were juniors in the education faculty of a public university in the west of Turkey's Black Sea Region in the 2016-2017 academic year. The study data were collected using an opinion form which included open-ended questions as well as interview questions. Pre-service teachers' written explanations to the open-ended questions were analyzed using content analysis, a qualitative analysis method. In addition, the study used descriptive analysis to assess the data that were collected during interviews with the purpose of obtaining further information. The research results show that a majority of pre service teachers' had positive opinions about formative assessment. They stated that formative assessment has many advantages such as enhancing efficiency, providing experience and self-evaluation.

Keywords: *Formative assessment, teacher training, preservice teachers.*

Introduction

Education aims to train individuals in a form ideally suited to meet the needs of the time. All of the works corresponding to this aim serve to constitute a qualified education. One of the most important elements governing the capacity to improve the quality of education is the "evaluation" stage, which acts as a control mechanism (Taras, 2002, 2003), as it serves to identify the extent to which the aims are achieved and the success of the elements (student, teacher, teaching method, teaching materials etc.) constituting the learning process. There are two types of assessment, product assessment, which is an assessment conducted at the end of units to determine what the students have learned, and formative assessment, which is an assessment conducted to determine the learning needs of the students (OECD, 2005; Liu & Carless, 2006). Recent results have shown that the product assessment methods, which are commonly used in schools and require the students to achieve predetermined standards in order to earn a diploma, are insufficient (OECD/CERI, 2008). Formative assessment methods, whose function is focused on preventing students from failing to continue their education in the future, serve as an alternative to the product assessment methods. Formative assessment is based on the principle that the needs of the students are determined in the process and that teaching is modified according to those needs. According to Shute (2007), the main objective of formative assessment is to increase the students' knowledge and skills, like drawing inferences or problem-solving in certain content areas. In this sense, the quality of learning can be increased through formative assessment (Higgins, Hartley, & Skelton, 2002). Gagne (cited in: Gibbs & Simpson, 2004) lists the effects of formative assessment in a learning environment as follows: activating and reinforcing background information and learning, ensuring that mainly active learning strategies are used, and enabling opportunities for the students to reinforce and implement their skills before introducing new information and materials to them. In addition to these, the following could be included: providing students with information and corrective feedback on the learning outcome, ensuring that the students are aware of their learning, and helping them develop self-evaluation skills, all of which will serve to give students the opportunity to experience the feeling of success.

Rubrics are one of the most important tools used in formative assessment. They are applied in the assessment process to identify the learners' knowledge and skills, study habits, efforts, and values according to predetermined criteria (Kan, 2007). In many studies conducted on the use of rubrics in the learning environments, it has been stated that the use of rubrics improves the quality of learning (Andrade, 2005; Andrade & Du, 2005; Panadero, Alonso-Tapia, & Huertas, 2012; Panadero, Alonso-Tapia & Reche, 2013; Reddy & Andrade, 2010). In a study by Panadero and Jonsson (2013), rubrics were found to be capable of positively affecting the learning of the learners. Additionally, Wollenschlager, Hattie, Machts, Moller and Harms (2016) found in their study that rubrics had a positive effect on performance. Teachers too have found rubrics to be quite useful (Kutlu, Bilican, & Yıldırım 2010).

A high-quality, up-to-date education requires practices that improve both skills and knowledge. Studies that seek

to understand how individuals internalize and use information in line with their aims and how they provide effective solutions to problems have therefore gained importance in the respective literature. Moreover, as it relates to pedagogy, taking applied classes during undergraduate education is of major importance. The acquisition of knowledge and skills that pre-service teachers can achieve by taking responsibility for their learning and doing self-evaluations plays a key role in improving their future teaching abilities. In the applied classes taken during undergraduate education, the quality and accuracy of the application are particularly important. In applications involving formative assessment, theory and practice are able to be bridged and self-evaluations are made possible through accurate performances. By offering applied classes during undergraduate education, there would be an improvement in the quality of the practices applied by pre-service teachers and they would be able to accurately employ the formative assessments, as they will have gained experience in how it is used and been given the opportunity to test its effectiveness. It is believed that the results of this study shall contribute to improving the quality standards in teacher training.

Purpose Of The Study

The purpose of this study is to investigate the views held by pre-service preschool teachers on the formative assessment process. This study was performed within the "Creativity and Its Improvement" class offered to second-year students under the Preschool Teacher Education Department. The participants' opinions on the use of formative assessment (rubrics, and verbal-written feedbacks), which they had learned about during the process of applying creative thinking techniques in actual classroom environments, were canvassed.

The following research questions were developed for the study:

1. What are the views of pre-service teachers regarding the advantages of formative assessment?
2. What are the views of pre-service teachers regarding the disadvantages of formative assessment?
3. What are the views of pre-service teachers regarding the use of rubrics in formative assessment?
 - a) What are the views of pre-service teachers regarding planning rubric?
 - b) What are the views of pre-service teachers regarding application rubric?
 - c) What are the views of pre-service teachers regarding finalization rubric?
4. What are the views of pre-service teachers regarding whether formative assessment contributes to professional development or not?

What are the views of pre-service teachers regarding the use of formative assessment in other courses?

Methodology

Study Design

This study adopted a qualitative case study design. The most important characteristic of a qualitative case study is its ability to perform an in-depth investigation of one or several cases (Yıldırım & Şimşek, 2008). Additionally, according to Büyüköztürk, Çakmak, Akgün, Karadeniz, and Demirel (2012), case studies are a type of study in which a phenomenon is described in a single space and time. In case studies, the researcher(s) is/are responsible for qualifying the case to be examined, and the cases are not restricted to only certain persons and objects that have a specific identity (such as a group, a person, a class, or an institution) but can also be an incident, an activity, or a process (Johnson & Christensen, 2014). The case investigated in this study is the evaluation process of pre-service teachers' practices in actual classroom environments using formative assessment.

Participants

A total of 63 second-year pre-service preschool teachers, who were studying at the Ereğli Faculty of Education of Zonguldak Bülent Ecevit University in the 2016-2017 academic year, participated in the study. The participants were between the ages of 19 and 21, and 60 were female and 3 were male. All of the participants were taking the "Creativity and Its Improvement" class for the first time.

Procedure

Within the scope of the "Creativity and Its Improvement" class, the participants were presented the general concepts of brainstorming, creative drama, analogy, and case study techniques, and model practices were demonstrated. After being provided the theoretical knowledge on these concepts, the participants were asked to conduct group work on one of these techniques and to plan an "application". Next, three rubrics (planning, application, and finalization rubrics) were given. The rubrics and the criterion governing them were explained, and it was made clear that the evaluation of the works would be conducted according to these rubrics. The pre-service teachers performed the implementation in the following three stages:

1st Stage: In the planning of the application process, the pre-service teachers plotted the procedure by considering the criterion in the "planning rubric". Each of the pre-service teachers presented their planned applications during their practice and in their classes (at the university). After the presentations, they were given verbal feedback by the instructor regarding the application plan of the techniques and the suitability of the techniques in terms of grade

level and creativity. A sample criterion for the planning rubric used by the pre-service teachers is given in Table 1.

Table 1: Sample Criterion for Planning Rubric

CRITERION	ACHIEVEMENT LEVELS		
	<u>5 points</u>	<u>10 points</u>	<u>20 points</u>
The nature of the technique	The technique is not planned properly	The technique planned partially conforms to the rules	The technique is planned properly

2nd Stage: The pre-service teachers started the implementation phase of their works which had been planned after receiving feedback. At this stage, the participants used an “application rubric”, and they implemented the subjects that they had selected by considering the criterion of the rubric in the classroom environment. The criterion in the application rubric covers the points that need to be paid attention to and taken into consideration during the implementation of the creative thinking techniques in the classroom environment. The techniques that the pre-service teachers were provided training on and given feedback for were implemented in 2-hour sessions in a preschool classroom (authentic classroom environment) with 5-6-year-old children. Each technique was implemented in a different school with different contents. A sample criterion for the application rubric is given in Table 2.

Table 2: Sample Criterion for Application Rubric

CRITERION	ACHIEVEMENT LEVELS		
	<u>2 points</u>	<u>5 points</u>	<u>10 points</u>
Imagination	None of the students used their imagination during the application.	Only a few students used their imagination during the implementation.	Many students used their imagination during the implementation.

3rd Stage: At this stage, the groups finished their application, prepared a PowerPoint presentation, which they presented to their instructors and classmates in the classroom environment (at the university), and prepared a report for their study. At this stage, the pre-service teachers used the finalization rubric. A sample criterion for the finalization rubric is given in Table 3.

Table 3: Sample Criterion for Finalization Rubric

CRITERION	ACHIEVEMENT LEVELS		
	<u>5 points</u>	<u>10 points</u>	<u>20 points</u>
Relating the collected data	The relations between the collected data are not shown and only seldom are inferences drawn from the application.	The collected data are only related to the rubric, making the inferences only partly sufficient.	Since the collected data are related based on the data received from multiple sources, the inferences drawn are quite sufficient.

Data Collection Tools

In this study, the data were collected from pre-service teachers through an open-ended questionnaire. This open-ended questionnaire was prepared in line with the research questions by the researcher. To confirm the content validity of the form and the interview questions, they were reviewed by two field experts and one assessment expert. When the actual classroom applications were completed, the form was administered to all of the participants, who filled it out individually. It took approximately 35 minutes for the participants to complete the form.

A sample question from the open-ended questionnaire:

What do you think are the advantages of formative assessment?

Interviews were used as another data collection tool for this study. The interview questions were prepared in line with the research questions. The interviews were conducted face-to-face with eight of the pre-service teachers from among the participants in order to investigate the research questions in-depth.

A sample question from the interviews:

Would you prefer the use of formative assessment in your other classes as well? Please explain your answer with reasons.

Data Analysis

The participants' answers to the open-ended questionnaire were analyzed using qualitative analysis techniques. The data obtained from the interviews were analyzed through descriptive analysis and investigated in line with the categories of the study, which were as follows: the advantages of formative assessment, the disadvantages of formative assessment, the use of rubric in formative assessment and the views on rubrics (planning rubric, application rubric, finalization rubric), contributions of formative assessment to professional development, and the use of formative assessment in other classes. The data were analyzed through content analysis, with two different raters analyzing the data, whose Miles-Huberman (Miles and Huberman, 1994) reliability value was found to be 93.67.

Findings

In this section, the findings from the study are presented in categories arranged in tables. Direct quotations from the views of the pre-service teachers were included as well.

The codes related to the "Advantages of Formative Assessment" category are given in Table 4.

Table 4: The Codes and Frequencies of the Advantages of Formative Assessment

Code	Frequency	Code	Frequency
Experience	35	Effective learning	5
Opportunity to perform application in the classroom environment	21	Motivation	5
Permanent learning	14	Guiding	4
Transferring theoretical knowledge into practice	12	Effective communication	3
Learning by doing	12	Awareness of the deficiencies of the class	3
Communication with students	9	Gaining experience by observation	3
Receiving feedback	7	Originality	3
Improving creativity	7	Knowing students	3
Mastery learning	7	An important activity	2
Individual evaluation	7	Critical thinking skill	2
First experience opportunity	6	Process evaluation	2
Awareness of different assessment techniques	6	Cooperation	2
Self-evaluation	6	Enjoyable	2
Gaining a different perspective	6	Socialization	1
Exchange of ideas	5		

According to Table 4, the pre-service teachers stated that among the advantages of formative assessment were that it provided experience and facilitated permanent learning by giving them the opportunity to practice in the classroom environment. Additionally, the participants thought that the application allowed them to transform theoretical knowledge into practical knowledge, contributed to learning by doing, and provided them the opportunity to communicate with the students. Pre-service teacher (PT -1) offered the following views on the advantages of formative assessment: *Formative assessment gives the pre-service teachers experience. It enables us to form our own ideas about our profession. Most importantly, it enables the person who thinks and feels that he/she should work as a teacher to definitively make that decision before the process is over.* Pre-service teacher (PT-6) added the following: *It enables active participation. Since each student has a role, the aim of the class is understood better. Any deficiencies in the studies are able to be identified during the presentation, and the views of other pre-service teachers are listened to and discussed. Group participation enables learning to take place together.* PT-2 offered the following views on communicating with students: *This is the first time that I have ever been to a kindergarten. I have practiced and spent time with children. This was a valuable opportunity for me to understand whether this profession is appropriate for me or not. I am quite happy; it was very important for me to participate in practicum and see the actual classroom environment.* It can be stated that the pre-service teachers gained professional development and experience in the use of assessment instruments.

The codes related to the “Disadvantages of Formative Assessment” category are given in Table 5.

Table 5: The Codes and Frequencies of the Disadvantages of Formative Assessment

Code	Frequency
No disadvantage	27
First-time application	7
Time-consuming	6
A difficult process	6
A stressful process	3
Unequal distribution of the responsibilities	3
Group work	3
Evaluation of the process	2
Insufficient experience regarding practice	2
Difficulty in controlling the process	2
Classroom management	1
The high number of evaluation criteria	1
Group evaluation during the process	1
Communication with students	1
The feeling of inadequacy in the process	1

According to Table 5, the majority of the pre-service teachers stated that formative assessment did not have any disadvantages. Some of the pre-service teachers cited their first time experience with the practice and the time-consuming and difficult nature of the process as disadvantages. Regarding this latter view, PT-5 stated the following: *This was my first practice and I hadn't worked at a preschool institution before, and I did not have any experience, therefore, I may not be able to demonstrate my full performance.* Similarly, PT-7 stated: *The application process was sometimes long and time-consuming.* During the process, group work was mentioned as a disadvantage, as expressed by PT-4, who stated: *Group work was definitely challenging. I could not fully implement what I thought because of the differences in opinions. There was no other disadvantage.* Although the formative assessment process is a time-consuming application, the majority of the pre-service teachers did not perceive this as a disadvantage.

The codes related to the “Use of Rubric in Formative Assessment” category are given in Table 6.

Table 6: The Codes and Frequencies of the Rubric Use in Formative Assessment

Code	Frequency
Guiding	26
Planning and organizing the process	13
Facilitates application and planning	6
Limits the process	5
Evaluates the process	5
Enables identification of the details	4
Enables identification of the deficiencies	4
Effective in the details of the process	3
Too detailed	3
Guide	3
Self-evaluation	3
Facilitating	2
Multidimensional thinking	2
Gaining points	2
Instruction	1
Making the process efficient	1
Guide	1
Objectivity	1

According to Table 6, the pre-service teachers thought that the rubrics used in formative assessment were guiding, that they helped in planning and organizing the process, and that they were necessary for limiting and evaluating the process. PT-1 had the following thoughts on the use of rubrics: *Rubrics made the process easier. We evaluated both ourselves and our process, so we became conscious and could think more critically.* Regarding the guiding feature of rubrics, PT-3 stated: *Having a rubric guided us in implementing the technique. Although we had learned the assessment in the class, the rubric helped us to understand why we did the assessment.* PT-5 added: *The use of the rubric is very important because it directs and enables awareness on the deficiencies. Additionally, we become aware of the points that we need to be careful about.* The positive views that the pre-service teachers had about rubrics and their characterization of them as guiding can be considered as the main reasons they adopted the formative assessment instrument and were willing to use it.

The codes related to the “Planning Rubric” category are given in Table 7.

Table 7: The Codes and Frequencies Regarding the Planning Rubric

Code	Frequency
Designing the process	14
Guiding	13
Organizing the process	11
Helps application	9
Showing the parts that need attention	9
Appropriate	6
Sufficient	5
Successful	4
Directive	3
Noticing the asking questions category	3
Beneficial	3
Necessary	3
Demonstrating the process step-by-step	3
Educational	3
Preparation for the application	2
Facilitating	2
Improving creativity	2
Detailed information	2
Self-confidence	1
A written framework of the process	1
Effective	1

According to Table 7, the pre-service teachers felt that since the planning rubric showed the points that needed attention, it helped them to perform the application and organize the process. Moreover, the pre-service teachers consider the rubric to be appropriate for the application, sufficient, and successful. PT-8 had the following thoughts on the planning rubric: *It acted as a blueprint to the questions of "How should I act?", "What should my application be like?", "What are my objectives?", and "How should I express them?", and it guided well.* PT-2 added: *It was important for us regarding the order of the plan and the points that need attention during the plan.* Finally, PT-3 stated: *When all was said and done, we had organization. In the absence of organization, discipline cannot be mentioned, and in the absence of discipline, success cannot be mentioned. We thought about what to do and what the questions should be.* From these opinions, it is clear that the planning rubric used in the formative assessment was guiding.

The codes related to the “Application Rubric” category are given in Table 8.

Table 8: The Codes and Frequencies Regarding Application Rubric

Code	Frequency
The inclusion of the practical aspect of the profession	13
Helpful in the classroom environment	12
The inclusion of the implementation stages	9
Planning the implementation process	8
Guides the application	7
Observing the students	7
Communication with students	7
Including the points that need attention in application	5
Changing according to the process	5
Successful	5
Fully sufficient	5
The most important part of the process	3
Appropriate	3
Note taking	2
The inclusion of the evaluation type	2
Beneficial	2
Has application aim	2
Effective	2
Improves creativity	2
School experience	2
Facilitating	1
Self-confidence	1
Internship	1

According to Table 8, the pre-service teachers stated that since the application rubric used in the formative assessment process includes application stages, it acted as a guide in the planning of the application process, and it provided an opportunity to observe and communicate with the students in the classroom environment. PT-5 expressed the following views regarding the application rubric: *It provided answers to my questions about how to do the application so that it enables use of the creative thinking technique. It helped us to make the right plan and act in the right way.* PT-6 added: *The application rubric provided an advantage by enabling the use of creative thinking skills and included the possible problems that may be faced during the application.* Finally, PT-1 stated: *Providing an application rubric is good; it provided information about how to do the application, which was nice, considering that I did not have previous experience.* The application rubric can be seen as a supplementary resource in the classroom environment, since it includes practical information on teaching.

The codes related to the “Finalization Rubric” category are given in Table 9.

Table 9: The Codes and Frequencies Regarding Finalization Rubric

Code	Frequency
Self-evaluation	10
Evaluation of the application process	10
Interpreting the results	7
Evaluating the activity	6
Appropriate	5
Seeing the objectives	5
Sharing the results	5
Evaluating the group	4
Awareness of the errors and deficiencies	4
Map of the products	3
Guide of the results	2
Effective reporting of the results	2
Raising awareness on the possible problems	2
Planning the evaluation	2

Beneficial	2
Planning the presentation	2
Sufficient	2
Revision	2
Critical thinking	2
Creativity	1
Successful	1

According to Table 9, the participants felt that the finalization rubric was effective in the evaluation of the application process and interpretation of the results. Additionally, they thought that the rubric was appropriate for the process and effective since it included the objectives. PT-2 offered the following views on the finalization rubric: *At the end of the application part, everything was finalized. As a result, the better I do this part, the better I can reflect my homework.* Regarding self-evaluation, PT-4 stated: *It is quite an important step in terms of evaluating the activity. It helped us by enabling us to ask the following questions to ourselves: "What did we do?", "What did we expect?", and "How did it happen?".* Additionally, PT-7 stated: *The finalization rubric enabled me to see what I have done in the application and the objectives.* From these statements, it is clear that the finalization rubric used in the formative assessment process provided an opportunity for self-evaluation.

The codes related to the “Contribution of the Formative Assessment to Professional Development” category are given in Table 10.

Table 10: The Codes and Frequencies Regarding Whether Formative Assessment Contributes to Professional Development

Code	Frequency	Code	Frequency
It contributed to professional development	23	Motivation	3
School experience	14	Developing original ideas	3
Preparation for the profession	13	Effective learning	3
Learning by doing	9	Enables permanence	2
Practicing in a real classroom environment	9	Seeing the results of methods and techniques	2
Transferring theoretical knowledge into practice	8	Making observation	2
Self-evaluation	8	Evaluation in the classroom environment	2
Evaluation	6	Beneficial	2
Communication with students	6	Classroom management	2
Awareness	6	Considering individual differences	1
First experience	5	Self-efficacy	1
First time communication with students	5	Reaching the objectives	1
Learning how to design a lesson procedure	5	Encouraging	1
Critical thinking	5		

According to Table 10, the participants felt that formative assessment contributed to professional development in terms of providing school experience, enabling the opportunity for practice in an actual classroom environment, transferring theoretical knowledge into practice, and enabling the opportunity of self-evaluation. On this issue, PT-8 stated: *It would be very pleasing to move from simple memorization to this system.* PT-3 added: *It certainly contributed to my professional development. Practicing with children in the real classroom environment moved the techniques outside the limits of formal information; it will enable us to conceptualize and conduct similar activities in the future.* Finally, PT-1 had the following to say on the subject: *This is the first time I have ever come across this type of assessment. I wish we had this assessment for each course. I wish that we could apply everything we learned so that the information would be more permanent.*

The codes related to the “Use of Formative Assessment in Other Course” category are given in Table 11.

Table 11: The Codes and Frequencies Regarding the Use of Formative Assessment in Other Courses

Category	Code	Frequency
Yes (41)	Turning theoretical knowledge into application	9
	Increasing permanence	8
	A beneficial application	7
	Learning by doing	6
	Applied system instead of memorization	5
	In applied classes	5
	In pedagogy classes	3
	Professional development	3
	Learning the subject comprehensively	3
	Communication with students	2
	Self-evaluation	2
	Cooperation	2
	Performance-based learning	2
	A different evaluation	2
	Facilitates learning	2
	Practice in the actual classroom environment	2
	Training experienced teachers	2
	Improving creativity	2
	Responsibility	1
	Developing ideas	1
Embodying	1	
Practical courses	1	
Experience	1	
No (4)	Not appropriate for each course	2
	Stressful process	1
	Time-consuming	1
In certain courses (13)	Permanence	3
	In field courses	2
	In applied classes	2
	Experience	1
	Educative	1
	Preparation for the profession	1
Depends on the content of the course	1	

According to Table 11, the majority of the participants felt that formative assessment should be used in other courses as well, particularly because it transforms theoretical knowledge into practice, increases permanence, is an educative application, and provides an opportunity to learn by doing rather than memorizing. Regarding its use in other courses, PT-2 said: *'Yes, I would definitely want it because it is an extraordinary evaluation method.* PT-6 stated: *'Yes, I would. I think its use, especially in the applied classes, will be beneficial for us.* Additionally, regarding its use in other written courses, PT-4 stated: *'Yes, I would want it. We won't teach by memorization, we will teach by doing. So, I think we need to learn by doing.'*

Conclusions, Discussion, And Implications

This study revealed that the views of the majority of the pre-service teachers regarding formative assessment were positive. Among these views, gaining experience, enabling permanence learning, and turning theoretical knowledge into practice stood out. Additionally, they felt that this application facilitated their professional development and provided them with a chance to communicate with the students in the classroom environment. The findings of other studies in the literature support the results of this study. Formative assessment is an application that includes various approaches capable of being used to support a student's learning (Van der Kleij, Vermeulen, Schildkamp, & Eggen, 2015; Briggs, Ruiz-Primo, Furtak, Shepard, & Yin, 2012). Decristan et al. (2015) conducted an experimental study on curriculum-embedded formative assessment and its effect on classroom quality and found that the curriculum-embedded formative assessment's impact on class quality for a science course taught on floating and sinking helped to facilitate the students learning. Bulunuz and Bulunuz (2013) noted in their study that the use of the formative assessment approach in science courses has high potential in terms of supporting conceptual learning. In a report by Jones (2005), it was stated that in order to progress in a specific activity it is necessary to provide feedback, which is an element of formative assessments, to the students. When the students are provided with feedback to improve the task that they are working on, the value they derive

from it is perceived as a motivator. Studies conducted in various fields of education have revealed that the formative assessment process needs to be actively employed in education.

Rubrics, which function as an element of formative assessment, was also addressed in this study. The pre-service teachers viewed the rubrics that they used in the process of formative assessment as guiding and directive. Additionally, they felt that the rubrics were beneficial and important insofar as they helped in planning and organizing the process. In terms of each specific rubric, the participants expressed that the planning rubric they used guided them by helping them to design and organize the process, that the application rubric helped to improve the practical aspect of the teaching profession and included the application steps for the classroom environment, and that the planning rubric facilitated their self-evaluation by interpreting the results and evaluating the process. Other studies in the literature that were conducted on the effectiveness of rubrics in the learning environments support the findings of this study. In education, rubrics are an effective tool for teacher training, scientific contents, and assessment processes (Alsina, Ayllón, Colomer, Fernández-Peña, Fullana, Pallisera, Perez-Burriel, & Serra, 2017; Harrison & Lee, 2011; Timmermann, Strickland, Johnson, & Payne, 2011; Ward & McCotter, 2004; Panadero & Jonsson, 2013).

The following implications were drawn from the findings of this study:

1. In faculties of education, formative assessment should be included as part of applied undergraduate courses. Additionally, even in theoretical courses, formative assessment can be used by including application as part of the course.
2. In-service teachers can be trained on formative assessment by means of in-service training.
3. Rubrics, which are one of the elements of formative assessment tools, can be implemented at every level of learning, from primary school to higher education. In this respect, different application types may be used for many courses.
4. In teacher training, formative assessment types can be tested on different sample groups with different applications and instruments.

Similar studies may be conducted in different teaching branches and with a higher number of participants.

References

- Alsina, Á., Ayllón, S., Colomer, J., Fernández-Peña, R., Fullana, J., Pallisera, M., Perez-Burriel, M., & Serra, L. (2017). Improving and evaluating reflective narratives: A rubric for higher education students. *Teaching and Teacher Education*, 63, 148-158.
- Andrade, H. G. (2005). Teaching with rubrics: The good, the bad, and the ugly. *College Teaching*, 53(1), 27-30.
- Andrade, H., & Du, Y. (2005). Student perspectives on rubric-referenced assessment. *Practical Assessment, Research & Evaluation*, 10(5), 1-11.
- Briggs, D. C., Ruiz-Primo, M. A., Furtak, E., Shepard, L., & Yin, Y. (2012). Meta-analytic methodology and inferences about the efficacy of formative assessment. *Educational Measurement: Issues and Practice*, 31(4), 13-17.
- Bulunuz, M., & Bulunuz, N. (2013). Fen öğretiminde biçimlendirici değerlendirme ve etkili uygulama örneklerinin tanıtılması. *Türk Fen Eğitimi Dergisi*, 10(4), 119-135.
- Büyüköztürk, Ş., Çakmak, E. K., Akgün, Ö. E., Karadeniz, Ş. & Demirel, F. (2012). *Bilimsel araştırma yöntemleri*. Ankara: Pegem Akademi.
- Decristan, J., Klieme, E., Kunter, M., Hochweber, J., Büttner, G., Fauth, B., Hondrich, A.L., Rieser, S., Hertel, S., & Hardy, I. (2015). Embedded formative assessment and classroom process quality: how do they interact in promoting science understanding? *American Educational Research Journal*, 52(6), 1133-1159.
- Gibbs, G., & Simpson, C. (2004). Conditions under which assessment supports students' learning. *Learning and Teaching in Higher Education*, 1, 3-31.
- Harrison, J. K., & Lee, R. (2011). Exploring the use of critical incident analysis and the professional learning conversation in an initial teacher education programme. *Journal of Education for Teaching: International Research and Pedagogy*, 37(2), 199-217.
- Higgins, R., Hartley, P., & Skelton, A. (2002). The conscientious consumer: reconsidering the role of assessment feedback in student learning. *Studies in Higher Education*, 27(1), 53-64.
- Johnson, B., & Christensen, L. (2014). *Eğitim araştırmaları: nicel, nitel ve karma yaklaşımlar*. (S. Demir, Trans.). Ankara: Eğitimci Kitap.
- Jones, C. A. (2005). Assessment for learning (Vocational learning support programme:16-19). London, UK: Learning and Skills Development Agency, Retrieved February 20, 2018, from <http://dera.ioe.ac.uk/7800/1/AssessmentforLearning.pdf>.
- Kan, A. (2007). Performans değerlendirme sürecine katkıları açısından yeni program anlayışı içerisinde kullanılabilecek bir değerlendirme yaklaşımı: Rubrik puanlama yöntemleri. *Kuram ve Uygulamada Eğitim Bilimleri / Educational Sciences: Theory & Practice*, 7(1), 129-152.

- Kutlu, Ö., Bilican, S., & Yıldırım, Ö. (2010). A study on the primary school teachers' attitudes towards rubrics with reference to different variables. *Procedia Social and Behavioral Sciences*, 2(2), 5398–5402.
- Liu N. F., & Carless, D. (2006). Peer feedback: the learning element of peer assessment. *Teaching in Higher Education*, 11(3), 279-290.
- Miles, M. B., Huberman, A. M., Huberman, M. A., & Huberman, M. (1994). *Qualitative data analysis: An expanded sourcebook*. sage.
- OECD, (2005). Formative assessment: Improving learning in secondary classrooms. *Policy Brief*, Retrieved February 28, 2018, from <http://www.oecd.org/publications/Policybriefs/>.
- OECD/CERI, (2008). *Assessment for learning: Formative assessment. International Conference, Learning in the 21st Century: Research, Innovation and Policy*. Paris: CERI/OECD, Retrieved March 20, 2018, from <http://www.oecd.org/dataoecd/19/31/40600533.pdf>.
- Panadero, E., Alonso-Tapia, J., & Huertas, J. A. (2012). Rubrics and self-assessment scripts effects on self-regulation, learning and self-efficacy in secondary education. *Learning and Individual Differences*, 22(6), 806–813.
- Panadero, E., Alonso-Tapia, J., & Reche, E. (2013). Rubrics vs. self-assessment scripts effect on self-regulation, performance and self-efficacy in pre-service teachers. *Studies in Educational Evaluation*, 39, 125–132.
- Panadero, E., & Jonsson, A. (2013). The use of scoring rubrics for formative assessment purposes revisited: a review. *Educational Research Review*, 9, 129–144.
- Reddy, Y. M., & Andrade, H. (2010). A review of rubric use in higher education. *Assessment & Evaluation in Higher Education*, 35(4), 435–448.
- Shute, V. J. (2007). *Focus on formative feedback*. Research Report. Princeton, NJ: Educational Testing Service, Retrieved April 2, 2018, from <https://onlinelibrary.wiley.com/doi/pdf/10.1002/j.2333-8504.2007.tb02053.x>.
- Taras, M. (2002). Using assessment for learning and learning from assessment, *Assessment & Evaluation in Higher Education*, 27(6), 501–510.
- Taras, M. (2003). To feedback or not to feedback in student self-assessment. *Assessment & Evaluation in Higher Education*, 28(5), 549-565.
- Timmermann, B., Strickland, D. C., Johnson, R. L., & Payne, J. R. (2011). Development of a “universal” rubric for assessing undergraduates' scientific reasoning skills using scientific writing. *Assessment & Evaluation in Higher Education*, 36(5), 509-547
- Van der Kleij, F. M., Vermeulen, J. A., Schildkamp, K., & Eggen, T. J. H. M. (2015). Integrating data-based decision making, Assessment for Learning, and diagnostic testing in formative assessment. *Assessment in Education: Principles, Policy & Practice*, 22(3), 324-343.
- Ward, J. R., & McCotter, S. S. (2004). Reflection as a visible outcome for preservice teachers. *Teaching and Teacher Education*, 20(3), 243-257.
- Wollenschlager, M., Hattie, J., Machts, N., Moller, J., & Harms, U. (2016). What makes rubrics effective in teacher-feedback? Transparency of learning goals is not enough. *Contemporary Educational Psychology*. 44, 1–11.
- Yıldırım, A., & Şimşek, H. (2008). *Nitel araştırma yöntemleri*. (7. Baskı). Ankara: Seçkin Yayıncılık.

Preservice Teachers' Awareness About Stem*

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Abstract

This quantitative study examines educational faculty preservice teachers' awareness about STEM in terms of different variables. Students from the departments of mathematics education, science education and computer and instructional technology at Afyon Kocatepe University were the participants. This is a survey study, which used the STEM Awareness Scale (SAS) developed by Buyruk and Korkmaz (2016) to collect the data. Some quantitative data analysis tests were applied on the data obtained. The results show that the preservice teachers had positive perspectives on STEM education.

Key words: *STEM, preservice teachers, awareness*

Introduction

STEM stands for science, technology, engineering and mathematics. The term was first used in 2001 by Dr. Judith Ramaley, the Education and Human Resources Director of the National Science Foundation (NSF) (Chute, 2009), making the NSF the first institution to use the term (NAE & NRC, 2009; Sanders, 2009). According to Morrison (2006), STEM is a new discipline based on the integration of science, technology, engineering and mathematics. Advancements in science and technology make it essential for individuals to acquire the skills to overcome real life problems, use their new knowledge in real life settings, think creatively, and use their knowledge at the appropriate time and place. For these reasons, STEM education is important today (Akgündüz, Ertepinar, Ger, Kaplan Sayı & Türk, 2015; Bybee, 2010).

STEM increases the quality of learning environments in education, makes teaching processes more effective, and gives students opportunities to integrate the disciplines of science, technology, engineering and mathematics. Science is the effort to understand the natural world (NRC, 1996). It examines the natural world and uses inquiry, invention, discovery and scientific methods in courses such as physics, biology, astronomy and geology from primary school to the university level (Dugger, 2010). Technology also uses discovery and scientific methods (Dugger, 2010). Technology changes the natural world based on the desires and needs of humankind (ITEA, 2000). It can be defined as the design, development and production of new materials using natural resources. Processes such as invention, innovation, practical problem solving and design are included in technology (Dugger, 2010). Engineering concerns finding solutions to the needs of humankind using mathematical and scientific knowledge obtained through practice and experience (ABET, 2007). Engineering involves problems that must be solved, understanding problems, asking relevant questions, setting up benchmarks for successful solutions and identifying limitations (Bybee, 2011). Mathematics is defined as the relationships among models, figures and numbers (AAAS, 1993). Mathematics serves as a real language for science, technology and engineering (Dugger, 2010).

STEM education involves activities that can foster students' interests and tendencies in science, technology, engineering and mathematics using the skills they should possess today (Baran, Canbazoglu Bilici & Mesutoğlu, 2015). STEM education is intended to transform theoretical knowledge into implementation, production and innovative discoveries. It enables students to consider their learning in science, technology, engineering and mathematics as parts of a whole. Many countries have incorporated STEM into their curricula. STEM education enables students to enlarge their physical, intellectual and cultural worlds and fosters their competence in critical thinking and problem solving (Çorlu & Aydın, 2016).

STEM education is an interdisciplinary approach to learning from primary school to graduate school. It offers students an interdisciplinary perspective on problems and some skills and knowledge using a holistic understanding of education (Şahin, Ayar & Adıgüzel, 2014). NSF launched activities to attract attention to the content of STEM education in the 1990s and many international studies have been conducted in this regard (Bracey & Brooks, 2013; Buxton, 2001; Cleaves, 2005; Nadelson, Seifert, Moll & Coat, 2012; Pinnell et al., 2013). However, the Turkish literature has focused on this issue only in the last few years (Baran, Bilici & Mesutoğlu, 2015; Çevik, 2015; Gencer, 2015; Şahin, Ayar & Adıgüzel, 2014; Yamak, Bulut & Dündar, 2014; Yıldırım &

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Altun, 2015). These studies have mostly investigated teachers' or preservice teachers' awareness about STEM, developed scales or adapted international scales into Turkish. For example, Karakaya, Ünal, Çimen, and Yılmaz (2018) investigated science teachers' awareness about the STEM approach in terms of some variables. They found significant differences by gender, professional experience, in-service training and educational level, but no significant difference by classroom size or type. Another study of teachers' perspectives on and awareness about STEM education found that science teachers know the STEM model better than teachers from other disciplines and use it more, that science and mathematics teachers consider their disciplines as an indispensable to the STEM model, but that they restrain themselves from applying the model (Özbilen, 2018). Rather than determining the general situation, studies of preservice teachers have mostly taken the form of scale adaptation.

There is a limited number of studies in the literature that examine preservice teachers' awareness about STEM in terms of various variables. Therefore, this study can contribute to the literature because it examines educational faculty preservice teachers' awareness about STEM in terms of different variables. It sought answers to these research questions:

1. What is the level of preservice teachers' awareness about STEM?
2. Is there a significant difference between the levels of preservice teachers' awareness about STEM by department?
3. Is there a significant difference between the levels of preservice teachers' awareness about STEM by gender?
4. Is there a significant difference between the levels of preservice teachers' awareness about STEM by grade level?

Method

The participants in this study were students in the departments of mathematics education, science education and computer and instructional technologies at the educational faculty of Afyon Kocatepe University. This quantitative study was designed as a survey. According to Karasar (2014), researchers should use survey study design if they intend to describe a case as it exists, whether it is an event, individual or object. The STEM Awareness Scale (SAS) developed by Buyruk and Korkmaz (2016) was used to collect data. The data were analyzed using IBM SPSS 18 software. The Kolmogorov-Smirnov test was done to analyze the normality of the data distribution and showed ($p < 0.05$) that the data did not have a normal distribution. Therefore, non-parametric tests were used. The Mann-Whitney U test was used to make a pairwise comparison, and the Kruskal-Wallis test was used to make multiple comparisons.

Findings

Table 1 shows the descriptive analysis of the preservice teachers' scores on the STEM Awareness Scale.

Table 1. Descriptive analysis of the STEM Awareness Scale scores

Department	Positive perspective			Negative perspective			Overall Scale		
	N	Mean	sd	N	Mean	sd	N	Mean	sd
Mathematics Education	115	3.99	.875	115	4.03	.683	115	4.01	.736
Science Education	113	3.78	1.07	113	3.53	1.21	113	3.70	.947
Computer and Instructional Technologies Education	87	3.81	.778	87	3.41	1.14	87	3.69	.707
TOTAL	315	3.87	.930	315	3.68	1.06	315	3.81	.821

Table 1 shows that the mean scores on the positive perspective sub-dimension ($\bar{X} = 3.87$), on the negative perspective sub-dimension ($\bar{X}=3.68$) and on the overall scale indicated that all of the preservice teachers had positive perceptions about STEM education ($\bar{X}=3.81$).

Table 2 shows the mean scores on the scale by department.

Table 2. Kruskal-Wallis test results for the comparison of the mean scores on the STEM Awareness Scale

Scale	Group	N	Mean Rank	sd	Chi-Square	p	Significant Difference
Positive	Math Edu.	115	163.96	2	2.013	.366	-
	Science Edu.	113	160.85				
	Comp. Edu.	87	146.43				
Negative	Math Edu.	115	182.96	2	14.964	.001	1-2 1-3
	Science Edu.	113	149.99				
	Comp. Edu.	87	135.41				
Total	Math Edu.	115	178.70	2	10.734	.005	1-2 1-3
	Science Edu.	113	152.72				
	Comp. Edu.	87	137.51				

Table 2 shows that, even though no significant was found in the positive perspective sub-dimension, the mathematics education preservice teachers had a higher mean score (163.96) than the science education and computer education and instructional technologies preservice teachers.

The variance of the preservice primary mathematics teachers' mean scores by gender is shown in Table 3.

Table 3. Mann-Whitney U test results for the comparison of the preservice primary mathematics teachers' mean scores by gender

Scale	Group	N	Mean Score	Rank Total	U	p
Positive	Female	78	64.26	5012.00	955.000	.003*
	Male	37	44.81	1658.00		
Negative	Female	78	62.06	4841.00	1126.000	.056
	Male	37	49.43	1829.00		
Total	Female	78	64.06	4996.50	970.500	.005*
	Male	37	45.23	1673.50		

Table 3 shows that the female preservice teachers had significantly more positive perceptions of STEM in the positive perspective sub-dimension and the overall scale. However, no significant difference was found by gender in the negative perspectives sub-dimension.

Table 4 shows the mean scores of the primary mathematics education preservice teachers by grade level.

Table 4. Kruskal-Wallis test results for the comparison of the preservice primary mathematics teachers' mean scores by grade level

Scale	Groups	N	Mean Score	sd	χ^2	p	Significant Difference
Positive perspective	1 st year	30	43.13	3	8.33	.040	1-2
	2 nd year	30	62.48				1-3
	3 rd year	30	65.50				1-4
	4 th year	25	61.46				
Negative perspective	1 st year	30	51.37	3	2.46	.483	-
	2 nd year	30	62.98				
	3 rd year	30	61.88				
	4 th year	25	55.32				
Total	1 st year	30	43.92	3	8.04	.045	1-2
	2 nd year	30	64.20				1-3
	3 rd year	30	65.75				
	4 th year	25	58.16				

Table 4 shows that the sophomore, junior and senior preservice teachers in the primary mathematics education department had significantly more positive perspectives on STEM in the positive perspective sub-dimension than the freshmen. Although no significant difference was observed in the negative perspective sub-dimension, the sophomore, junior and senior preservice teachers had more positive perspectives in the negative perspectives sub-dimension than the freshmen.

Table 5 shows the preservice science teachers' mean scores by gender.

Table 5. Mann-Whitney U test results for the comparison of the preservice science teachers' mean scores by gender

Scale	Group	N	Mean Score	Rank Total	U	p
Positive	Female	93	59.97	5577.00	654.00	.037*
	Male	20	43.20	864.00		
Negative	Female	93	59.85	5566.00	665.00	.045*
	Male	20	43.75	875.00		
Total	Female	93	60.45	5622.00	609.00	.016*
	Male	20	40.95	819.00		

Table 5 shows that the female preservice teachers had significantly more positive perceptions of STEM in the sub-dimensions and the overall scale.

Table 6 shows the mean scores of science education preservice teachers by grade level.

Table 6: Kruskal Wallis test results for the comparison of the preservice science teachers' mean scores by grade level

Scale	Groups	N	Mean Score	sd	χ^2	p	Significant Difference
Positive	1 st year	27	39.65	3	11.543	.009*	1-2
	2 nd year	32	68.13				1-3
	3 rd year	26	59.69				1-4
	4 th year	28	58.52				
Negative	1 st year	27	46.07	3	14.276	.003*	1-2
	2 nd year	32	73.19				2-4
	3 rd year	26	60.19				
	4 th year	28	46.07				
Total	1 st year	27	39.67	3	15.994	.001*	1-2
	2 nd year	32	73.19				1-3
	3 rd year	26	59.56				2-4
	4 th year	28	52.84				

Table 6 shows that compared to the freshmen, the sophomore, junior and senior preservice teachers in the science education department had significantly more positive perspectives on STEM in the positive perspective sub-dimension. On the negative perspective sub-dimension of the scale, the sophomore preservice teachers had less negative perspectives on STEM than the freshmen and seniors. On the overall scale, the sophomore and junior preservice teachers had more positive perspectives on STEM than the freshmen, and the senior preservice teachers had more negative perspectives on STEM than the sophomores.

Table 7 shows the preservice computer and instructional technologies teachers' mean scores by gender.

Table 7: Mann-Whitney U test results for the comparison of the preservice computer and instructional technologies teachers' mean scores by gender

Scale	Group	N	Mean score	Rank total	U	p
Positive	Female	48	49.98	2399.00	649.000	.014*
	Male	39	36.64	1429.00		
Negative	Female	48	50.98	2447.00	601.000	.004*
	Male	39	35.41	1381.00		
Total	Female	48	51.47	2470.50	577.500	.002*
	Male	39	34.81	1357.50		

Table 7 shows that the female computer and instructional technologies preservice teachers had significantly more positive perspectives on STEM in the sub-dimensions of the scale and the overall scale.

Table 8 shows the mean scores of the computer and instructional technologies preservice teachers by grade level.

Table 8. Kruskal Wallis test results for the comparison of the preservice computer and instructional technologies teachers' mean scores by grade level

Scale	Groups	N	Mean Score	Sd	Chi-square	P	Significant Difference
positive perspective	2 nd year	30	37.10	2	9.893	.007	2-4
	3 rd year	30	39.57				
	4 th year	27	56.59				
Negative perspective	2 nd year	30	42.73	2	0.119	.942	3-4
	3 rd year	30	44.50				
	4 th year	27	44.85				
Total	2 nd year	30	38.78	2	4.868	.088	2-4
	3 rd year	30	41.33				
	4 th year	27	52.76				

Table 8 shows that, compared to the sophomores, the senior preservice teachers had significantly more positive perspectives on STEM education in the positive perspective sub-dimension of the scale and the overall scale. In the negative perspectives sub-dimension, the senior preservice teachers had less negative perspectives than the juniors.

Conclusions

The results indicate that the preservice teachers from the departments of mathematics, science, and computer and instructional technologies have positive perspectives towards STEM, which is corroborated by many studies of preservice teachers and STEM education (Akaygun & Aslan-Tutak, 2016; Yenilmez & Balbağ, 2016; Yıldırım & Selvi, 2015). This also underlines that preservice teachers had positive awareness about STEM. Studies have shown that individuals with high awareness about STEM also have more positive perceptions of and perspectives on it (Guzey, Harwell & Moore, 2014; Schmidt & Kelter, 2017).

The preservice teachers in the department of mathematics education had more positive perceptions of STEM. Yenilmez and Balbağ (2016) reported that preservice science teachers have more positive attitudes. This may stem from preservice teachers' learning backgrounds or the difference between their undergraduate courses. The females' mean scores on the STEM Awareness Scale were higher than the males in all departments. This result is corroborated by those of Yenilmez and Balbuğ (2016). Çevik, Danişay and Yağcı (2017) investigated teachers' awareness about STEM by gender and found no significant difference by gender. Therefore, the effect of the gender variable on the awareness about STEM may differ in preservice or in-service training courses.

By grade level, the sophomore, junior and senior preservice teachers from the department of mathematics education had more positive perspectives on STEM than the freshmen. This may imply that courses in mathematics education positively influence their perceptions of STEM. The sophomore, junior and senior preservice science teachers had significantly higher mean scores on the positive perspective sub-dimension of the scale than the freshman. However, the senior preservice science teachers had less negative perceptions of STEM in the other sub-dimensions of the scale and the overall scale than the sophomores. The reasons for this can be investigated in further qualitative research. On the other hand, the senior preservice computer and instructional technologies education preservice teachers had more positive perceptions of STEM than the sophomores and juniors.

References

- AAAS. (1993). *Benchmarks for science literacy*. New York, NY: Oxford University Press.
- ABET (2007). *The Engineering Accreditation Commission of the Accreditation Board of Engineering and Technology*. Accreditation handbook online. Available at: <http://www.abet.org>.
- Akaygun, S., & Aslan-Tutak, F. (2016). STEM images revealing stem conceptions of pre-service chemistry and mathematics teachers. *International Journal of Education in Mathematics, Science and Technology*, 4(1), 56-71. DOI:10.18404/ijemst.44833

- Akgunduz, D., Ertepinar, H., Ger, A. M., Kaplan Sayi, A., & Turk, Z. (2015). The report of STEM education workshop: An assessment on STEM education in Turkey. *Istanbul Aydın University: STEM Centre and Faculty of Education*.
- Baran, E., Canbazoglu-Bilici, S., & Mesutoğlu, C. (2015). Fen, Teknoloji, Mühendislik ve Matematik (FeTeMM) spotu geliştirme etkinliği. *Araştırma Temelli Etkinlik Dergisi*, 5(2), 60-69
- Bracey, G., Brooks, M., Marlette, S., & Locke, S. (2013). Teachers' training: Building formal STEM teaching efficacy through informal science teaching experience. In *ASQ Advancing the STEM Agenda Conference, Grand Valley State University, Michigan*.
- Buxton, C. (2001). Exploring science-literacy-in-practice: Implications for scientific literacy from an anthropological perspective. *Electronic Journal in Science and Literacy Education*, 1(1). Retrieved from <http://sweeneyhall.sjsu.edu/ejls/>
- Buyruk, B., & Korkmaz, Ö. (2014). FeTeMM farkındalık ölçeği (FFÖ): geçerlik ve güvenilirlik çalışması. *Journal of Turkish Science Education*, 11(1), 3-23.
- Bybee, R. W. (2010). Advancing STEM education: A 2020 vision. *Technology and Engineering Teacher*, 70(1), 30.
- Bybee, R. W. (2011). Scientific and engineering practices in K-12 classrooms. *Science Teacher*, 78(9), 34-40.
- Çevik, M. (2017). Content analysis of stem-focused education research in Turkey. *Journal of Turkish Science Education (TUSED)*, 14(2).
- Çevik, M., Daniştay, A., & Yağcı, A. (2017). Ortaokul öğretmenlerinin Fetemm (fen-teknoloji-mühendislik-matematik) farkındalıklarının farklı değişkenlere göre değerlendirilmesi. *Sakarya University Journal of Education*, 7(3), 584-599.
- Chute, E. (2009). Lack of diversity part of equation in STEM fields. Colleges try to increase numbers of women, minorities in science and engineering. *Pittsburgh Post-Gazette*. Retrieved 2/21/10 from <http://www.post-gazette.com/pg/09041/947952-298.stm#ixzz0glceZiGK>
- Cleaves, A. (2005). The formation of science choices in secondary school. *International Journal of Science Education*, 27(4), 471-486.
- Corlu, M. A., & Aydin, E. (2016). Evaluation of learning gains through integrated STEM projects. *International Journal of Education in Mathematics, Science and Technology*, 4(1), 20-29.
- Dugger, W. E. (2010, December). Evolution of STEM in the United States. In *6th Biennial International Conference on Technology Education Research in Australia* retrieved from <http://www.iteea.org/Resources/PressRoom/AustraliaPaper.pdf>.
- Gencer, A. S. (2015). Fen eğitiminde bilim ve mühendislik uygulaması: firıldak etkinliği. *Araştırma Temelli Etkinlik Dergisi*, 5(1), 1-19.
- Guzey, S. S., Harwell, M. ve Moore, T. (2014). Development of an Instrument to assess attitudes toward Science, Technology, Engineering, and Mathematics (STEM). *School Science and Mathematics*, 114 (6), 271-279.
- ITEA. (2000). Standards for technological literacy: Content for the study of technology. Reston, VA: Author.
- Karakaya, F., Ünal, A., Çimen, O., & Yılmaz, M. (2018) Fen bilimleri öğretmenlerinin stem yaklaşımına yönelik farkındalıkları. *Eğitim ve Toplum Araştırmaları Dergisi/JRES*, 5(1), 124-138.
- Karasar, N. (2014). *Bilimsel Araştırma Yöntemi*, Ankara: Nobel Yayın, 26.
- Morrison, J. (2006). TIES STEM education monograph series, attributes of STEM education. *Baltimore, MD: TIES*, 3.
- Nadelson, L. D., Seifert A., Moll, A. J. & Coat, B. (2012). I-STEM Summer Institute: An integrated approach to teacher professional development in STEM. *Journal of STEM Education*, 13(2), 69-83.
- National Academy of Engineering and National Research Council [NAE & NRC]. (2009). *Engineering in K-12 education: Understanding the status and improving the prospects*. Washington: National Academies Press.
- National Research Council (NRC). (1996). National science education standards. Washington, DC: National Academy Press.
- ÖZBİLEN, A. G. (2018). Stem eğitimine yönelik öğretmen görüşleri ve farkındalıkları. *Scientific Educational Studies*, 2(1), 1-21.
- Pinnell, M., Rowley, J., Preiss, S., Franco, S., Blust, R. ve Beach, R. (2013). Bridging the gap between engineering design and PK-12 curriculum development through the use of the STEM education quality framework. *Journal of STEM Education*, 14(4), 28-35.
- Şahin, A., Ayar, M. C., & Adıgüzel, T. (2014). Fen, teknoloji, mühendislik ve matematik içerikli okul sonrası etkinlikler ve öğrenciler üzerindeki etkileri. *Kuram ve Uygulamada Eğitim Bilimleri*, 14(1), 1-26.
- Sahin, A., Ayar, M. C., & Adiguzel, T. (2014). STEM related after-school program activities and associated outcomes on student learning. *Educational Sciences: Theory and Practice*, 14(1), 309-322.
- Sanders, M. (2009). STEM, STEM education, STEM mania. *Technology Teacher*, 68(4), 20-26.
- Schmidt, K. M. ve Kelter, P. (2017). Science Fairs: A Qualitative Study of Their Impact on Student Science Inquiry Learning and Attitudes toward STEM. *Science Educator*, 25(2), 126-132.

- Yamak, H., Bulut, N., & Dündar, S. (2014). 5. Sınıf öğrencilerinin bilimsel süreç becerileri ile fene karşı tutumlarına FeTeMM etkinliklerinin etkisi. *Gazi Üniversitesi Gazi Eğitim Fakültesi Dergisi*, 34(2).
- Yenilmez, K ve Balbağ, M. Z. (2016). Fen bilgisi ve ilköğretim matematik öğretmeni adaylarının STEM'e yönelik tutumları. *Journal of Research in Education and Teaching*, 5(4), 301-307.
- Yıldırım, B. ve Selvi, M. (2015). Adaptation of STEM attitude scale to Turkish. *Turkish Studies*, 10(3), 1107-1120.
- Yıldırım, B., & Altun, Y. (2015). Investigating the effect of STEM education and engineering applications on science laboratory lectures. *El-Cezerî Journal of Science and Engineering*, 2(2), 28-40.

Pre-Service Teachers' Stem Teaching Intention And Views About Stem

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Abstract

The aim of the current research is to determine the STEM teaching intention of pre-service teachers and learn their views towards STEM and STEM implementations. Mixed method research was used in this study. For the quantitative part of the research, the data were collected through "Integrative STEM Teaching Intention Questionnaire" developed by Lin and Williams (2015) and the Turkish version of the questionnaire adapted by Hacıömeroğlu and Bulut (2016). The scale consist of 31 items, 7 likert type and five dimensions. In the qualitative part of the research semi-structured interview technique was used. One of the purposeful sampling methods', criterion sampling was used for the selection of the participants. The students of primary school teacher training program were chosen as the participants of the current research. After analyzing process, the results showed that pre-service teachers' STEM teaching intentions were high. The results of the qualitative part of the study were tally with the results of the quantitative part. According to the result of the qualitative of the current research, it was shown that the teacher candidates believed themselves using STEM in their classes and if they had problems they believed to solve them while implementation of STEM.

Keywords: *Pre-service teachers, STEM, STEM education, STEM teaching intentions,*

Introduction

The need for qualified people has caused the countries to go for a change in their education policies. "In the 21st century, developments in science, technology, engineering, and mathematics, in particular, have accelerated in all areas, but have almost influenced every aspect of modern life and play a key role in solving the most immediate and future problems of humanity" (National Research Council-NRC, 2012). For this reason, the present education systems aim efficient learning and teaching approaches in order to cope with economic races, ever-growing technologies, vast amounts of information and other concerns of the 21st century (Wells, 2008). STEM (Science, Technology, Engineering, and Mathematics) education which drew attention to this point during the last years is an approach that unifies science, technology, engineering and mathematics content, and skills during the teaching-learning process. The STEM is an integrated approach and aims the students to look at the problems with an inter-discipline point of view and to acquire knowledge and skill.

When we consider the fast advancement of science and technology, it is accepted by the majority that the students need to deal with real problems through a multi-discipline education program that merges theory and practice and to increase their creative skills in problem-solving. This situation brings forth the STEM education (Chang et. al, 2015). Since STEM has the potential in developing the capacity of innovation and competition power of nations originating from labor and industry branches, these disciplines are important. The request for STEM has increased in speed for the last ten years for sustainable economic growth and a brighter future (Langdon, Mckittrick, Beede, Han and Doms, 2011).

When the needs of the age we live in are considered, there is a need for individuals who can solve real-world problems in areas such as science, technology, mathematics, and engineering, not just with understanding the relationship between science and technology, but with interdisciplinary relations. The STEM is preferred as the strongest model to be used in this context. This is because STEM contributes to society in terms of leadership in technology and economy, success in science and mathematics, raising qualified individuals, developing sustainable economics, developing skills (scientific process, investigation, critical thinking, etc.), solving real-world problems and being productive, and increasing the number of individuals needed in the twenty-first century working environment (Toulmin and Groome, 2007).

An integrative viewpoint in STEM education can be thought of as the adaptation of the four fields as content, or as a context in which one is taken into focus and others are taught the content of this discipline. It can also be done in the form of combining at least two of these four areas, if not all of them. For example, to provide integration of mathematics, engineering, and technology in the context of science lessons (Dugger, 2010). However, the interpretation of STEM as science or mathematics and the lack of recollection of technology or engineering is a subject that needs to be solved (Bybee, 2010).

STEM education is an educational approach distinguished by interdisciplinary nature from pre-school education to university education (Gonzalez and Kuenzi, 2012). There are sufficient research results that show STEM

education has positive effects on students' achievement, interests, and motivations. This leads to the increased practice of the STEM approach and to be worked on more (Sanders, 2009).

The fact that countries that implement the STEM as an education system on an international platform have seen significant increases in the results of the global assessment examinations such as PISA and TIMSS have led other countries to focus their attention on the STEM and have focused their training reforms on an additional interest in STEM education. The PISA 2015 results showed that the performance of Turkish students was below the average of scientific literacy, mathematics literacy and reading skills (MEB, 2016a). The findings of TIMSS 2015 revealed that Turkish students did not have an excellent success in terms of science and mathematics performance (MEB, 2016b). OECD Education at a Glance when seen which countries will take the lead professions in the future STEM area according to the 2017 report, Turkey appears to be the last among 34 countries (OECD Education at a Glance, 2017). These results suggest that Turkey also needs to be done in a systematic education reform across the country and revealed the necessity of the increase in the STEM applications.

Because of these developments emerging in the field of education in Turkey, arrangements were made in 2017 for all curricula from elementary school to high school to be renewed. Primary school, mathematics, science, and technology-design teachers need to cooperatively develop investigation-based STEM teaching plans that support students' critical and creative thinking skills. So, the teachers and also the pre-service teachers have to learn STEM and how to implement STEM in their classes.

Teachers have a key role in implementing and spreading STEM education throughout the country. This is because the increase in employment of the countries in the areas of STEM depends on the quality of teachers who can give STEM education to the students at an early age (Wang, 2012). Teachers who will give STEM training should be educated in this field both as interservice and in before service (Çorlu, Capraro and Capraro, 2014). However, when compared with the developments in the world, it is not at the desired and expected level and it is pointed out that the universities should take measures in this regard urgently (Çolakoğlu and Gökben, 2017). The aim of the current research is to determine the STEM teaching intention of pre-service teachers and learn their views towards STEM and STEM implementations.

The Methodology Of The Study

Mixed method was used for current research. Different patterns can be used in mixed method researches. One of these patterns is convergent parallel design. Qualitative and quantitative stages occur simultaneously in the same phase of the research process. This pattern gives equal priority to the methods, separates the phases from each other during analysis, and then combines the results when doing general interpretation (Creswell and Plano Clark, 2015). While quantitative data are collected during the screening type surveys, data obtained through questionnaires or interviews are described by statistically analyzed analysis of the questions or hypotheses that are raised at the beginning of the study. The results of the statistical analysis are interpreted in relation to previous research findings (Creswell, 2012). In this context, STEM teaching intentions of participants were determined using the "Integrative STEM Teaching Intention Questionnaire" in the quantitative survey of this research. In the qualitative dimension of the study, the interview technique was used. Interviewing is a useful technique that is used when participants want to understand their point of view or to learn how participants understand the facts and events. It is possible to classify the interview technique as structured, semi-structured and unstructured interviews. When determining the type of interview to be used, the types of questions to be asked and the types of responses desired should be taken into consideration (Yıldırım and Şimşek, 2013, Berg and Lune, 2015). Qualitative aspects of this study were based on a semi-structured interview technique for taking the participants' views about STEM and STEM implementations.

One of the purposeful sampling methods', criterion sampling was used for the selection of the participants. The main criterion was to taken "Science teaching method course I" and "Mathematics teaching method course I" by pre-service teachers. According to this criterion, the students of primary school teacher training program of the education faculty of a state university were chosen as the participants of the current research.

For the quantitative part of the research, the data were collected through "Integrative STEM Teaching Intention Questionnaire" developed by Lin and Williams (2015) and the Turkish version of the questionnaire adapted by Hacıömeroğlu and Bulut (2016). The adapted questionnaire includes 31 items placed on a 7-point likert type scale. The questionnaire includes five sub-scales: knowledge ($\alpha=.93$), value ($\alpha=.86$), attitude ($\alpha=.87$), subjective norm ($\alpha=.69$), perceived behavioral control and behavioral intention ($\alpha=.86$). Cronbach's alpha coefficient for the overall instrument was calculated as .94.

In the qualitative part of the research, the data were collected through semi-structured interview form. The interview form was developed by researcher then given to two experts to provide internal validity of the interview form, and the form took its final shape by being reviewed. After a student engaged in the pilot interview the sound recording was transcribed. The interview printout form was computerised in order to determine whether or not the questions were clear and comprehensible and the answers of the student reflected the answers of the questions. At the end of this study, the validity of the questions was determined. The data were analyzed using descriptive statistics for quantitative part. The content analysis technique was used to analyze the qualitative data.

Findings

The quantitative part of the study examined pre-service teachers’ STEM teaching intentions with descriptive analysis.

Table 1 shows the results of the descriptive analysis scores obtained from “Integrative STEM Teaching Intention Questionnaire”.

Table 1. Descriptive analysis results of the “Integrative STEM Teaching Intention Questionnaire”

Name of the scale	Sub-factors	N	X	s
Integrative STEM Teaching Intention Questionnaire	Knowledge	104	5,48	1,04
	Value	104	6,30	,69
	Attitude	104	6,00	,85
	Subjective norm	104	5,09	1,13
	Behavioral control and behavioral intention	104	6,15	,65
	Total	104	5,89	,64

Findings of the quantitative part of the current research revealed that intentions of the pre-service teachers about knowledge, value, attitude, subjective norm, perceived behavioral control and behavioral intention were generally positive. According to the sub-factors of the scale, one of the sub-factors (value) level were “I agree exactly”, three of the sub-factors (knowledge, attitude, perceived behavioral control and behavioral intention) level was “I agree” and one sub-factor’s (subjective norm) level was “I rather agree”. The findings showed that pre-service teachers’ STEM teaching intentions were high.

Findings of the qualitative part of the current research, various sub-themes and categories obtained from the interviews are shown in the following tables, the findings were presented comparatively, the examples were given by direct citations, and some deductions were made about the differences obtained from the findings. The first theme, its’ sub-themes and categories obtained from the data analysis of semi-structured interviews presented in Table 2.

Table 2. Sub-themes and categories under the main theme of STEM and STEAM

Theme	Sub-themes	Categories
STEM and STEAM	Definition of STEM	Interdisciplinary connection
	Reason for STEM	Adaptation to requirements of age
		Relation of science fields
		To develop the community
	Reason for STEAM (STEM + Art)	Social requirement for art culture Need for aesthetics Contribution to human psychology (relaxation, fun)
Connection to everyday life	Contribution to the solution of the problems of life Support for creative practices Understanding the connection between life and science	

The participants expressed their thoughts about “STEM and STEAM”. Ahmet said “It is the combination of science, math and technology courses that create a interdisciplinary connection and teaching the students about different branches in a joint way and making them practice likewise”.

In the sub-theme “Reason for STEM”, Hanife also said “Interdisciplinary dialogs have become more integrated over the last century. The more the modern technology advances the more it is needed. If you do some work on physics, mathematics gets involved. These were gathered under a roof and given a name. I think this was made with the purpose of educating students in line with the requirements of the modern time”.

Erkan said, on the other hand, about “Reason for STEAM” sub-theme, “People are always more comfortable with art, it is easier to practice. So, although engineering or math is quite terminological, including theatre, drama, painting, poetry, music, visual arts, etc. into them would make student more comfortable. Studying them would become more enjoyable”. In the sub-theme “Connection to everyday life”,

In the theme “STEM and STEAM” about the sub-theme “Connection to everyday life”, Mahmut said, “Designing a project in STEM is a perfect practice for finding a solution for an everyday problem and it is very creative. Students can also use what they learn in courses in their daily life”.

The second theme and its’ sub-themes and categories obtained from the data analysis of semi-structured interviews presented in Table 3.

Table 3. Sub-themes and categories under the main theme of STEM practices and education

Theme	Sub-themes	Categories
STEM practices and education	Advantages of STEM practices	Development of the sense of curiosity and research
		Permanent learning
	Disadvantages of STEM practices	Ability to work collaboratively
		Contribution to the choice of profession
	Personal beliefs in STEM education	Takes a long time
Suggestions for STEM education	Personal beliefs in STEM education	Teacher's lack of knowledge about STEM
		Economic problems
		Incompatibility with the exam system
STEM practices and education	Suggestions for STEM education	Believe in ease of practice
		Believe in that success of practices will increase with experience
		STEM practices contribute to teachers and teacher candidates in school experience courses
		Teacher candidates can do project works in faculties for education methods (science education, mathematics education, etc.) courses
STEM practices and education	Suggestions for STEM education	Seminars and practical courses can be organized for teachers
		School principals should be informed about STEM so that they can guide the teachers in the school

In the theme “STEM practices and education” about the sub-theme “Advantages of STEM practices”, Remziye said “First of all, I think STEM practices are fun for the child. It enhances the sense of wonder. They learn to research. They gain a lot at the same time. They learn that they are all integrated”, and Nilay said “It contributes to the children in that they learn what the teamwork is, respect for other ideas and they learn to think more creatively. From my point of view, while my students learn more effectively they also play a more active role in the classes. Learning becomes permanent for students”.

In the sub-theme “Disadvantages of STEM practices”, Mahmut said “It definitely has a disadvantage. After all, it takes a lot of time. Also you can't teach everything in detail. For instance, the exams were TEOG or something like that. There are really ridiculous questions in that exam. I don't think we can cover everything of the subject through this STEM method. Students may not solve the current question types in the exam”, Remziye said “It is a disadvantage that it is a long term practice. Teaching math while referring to science, math, engineering or art instead of passing the information directly would take a long time”.

In the theme “STEM practices and education” about the sub-theme “Personal beliefs in STEM education”, Erkan said “I think I can implement STEM quite willingly. It is already within the possibilities, though. I think we can implement STEM education no matter where we are in our country. I think I can achieve a lot with low cost. I would use STEM in my class” and Ahmet said “After I gain more insight about my professional life in a year, It might be more prospective. I might struggle in my first year. But later on, I think I may use STEM for implementation and education in class easily”.

In the sub-theme “Suggestions for STEM education”, Hanife said “Applied courses are possible. For example, teacher candidates that go to schools for training, in other words to take "school experience" course may compromise with the teachers there and teach this course together in second semester. They can implement STEM together in the class” and also Mahmut said “Although seminars and conferences are organized there

can be teachers that are unavailable and uninformed. This is a big problem. We must inform those teachers in one way or another. First, principals should be informed and educated about this practice and then they should play an active role in the education of teachers”.

Conclusions

The quantitative results of the current research showed that pre-service teachers' STEM teaching intentions were high. In the research that Kırılmazkaya (2017) conducted, it is identified that the class instructors have a general positive view towards STEM education.

In the current research, according to the sub-factors of the scale, one of the sub-factors (value) level were “I agree exactly”, three of the sub-factors (knowledge, attitude, perceived behavioral control and behavioral intention) level was “I agree”. As a result of the STEM teaching intentions study conducted by Kırılmazkaya (2017) it was stated that the STEM teaching orientations corresponded to the "agreeing" range of views of STEM teaching orientation in values, attitude, perceived behavioral control and behavioral orientation dimensions. This finding shows similarity with the studies that express that the teacher candidates have positive attitudes towards STEM education (Adams, Miller, Saul & Pegg, 2014; Çorlu, Capraro & Çorlu, 2015). In the literature, there are studies investigating the attitudes of teacher candidates towards teaching STEM. In some researches carried out, it has been revealed that, it was concluded that the prospective teachers were in a positive attitude towards teaching STEM (Akaygün ve Aslan-Tutak, 2016; Çorlu, Capraro & Çorlu, 2015).

According to the result of the qualitative part, it was shown that the teacher candidates believed themselves using STEM in their classes and if they had problems they believed to solve them while implementation of STEM. Also they believed the importance of STEM teaching. The opposite results according to current research was Yıldırım and Selvi's (2016) study, in their study, show that teacher candidates do not have not enough knowledge and ability in STEM education and that it is difficult to associate STEM knowledge with everyday life practices and at the same time have some misconceptions about STEM education.

In the light of the results, it may be advised to conduct new studies in different branches and with different scales in a larger sample group due to the fact that different results have been obtained both in the literature and in the current study.

It may be advised that the academicians can implement STEM in their teaching method courses with pre-service teachers.

Mixed method is used in this study and case studies or action researches may be conducted in order to obtain in-depth results in schools with teachers.

References

- Adams, A. E., Miller, B. G., Saul, M. ve Pegg, J. (2014). Supporting elementary pre-service teachers to teach STEM through place-based teaching and learning experiences. *Electronic Journal of Science Education*, 18(5), 1-22.
- Akaygün, S., ve Aslan-Tutak, F. (2016). STEM images revealing STEM conceptions of pre-service chemistry and mathematics teachers. *International Journal of Education in Mathematics, Science and Technology*, 4(1), 56-71.
- Berg, B. L. ve Lune, H. (2015). *Sosyal bilimlerde nitel araştırma yöntemleri.* (Çev. Ed. Aydın, H.). Konya: Eğitim Yayınevi.
- Bybee, R. W. (2010). Advancing STEM education: A 2020 vision. *Technology and Engineering Teacher*, 70(1), 30-35.
- Chang, S. H., Ku, A. C., Yu, L. C., Wu, T. C. and Kuo, B.C. (2015). A Science, Technology, Engineering and Mathematics Course with Computer-Assisted Remedial Learning System Support for Vocational High School Students. *Journal of Baltic Science Education*, 14 (5), 641-654.
- Christensen, L. B., Johnson, R. K. ve Turner, L. A. (2015). *Araştırma yöntemleri, desen ve analiz.* (Çev. Ed. Aypay, A.) Ankara: Anı Yayıncılık.
- Creswell, J. W. (2012). *Educational research, planning, conducting, and evaluating quantitative and qualitative research.* 4th Ed. Boston: Pearson Education, Inc.
- Creswell, J. W. ve Plano Clark, V. L. (2015). *Karma yöntem araştırmaları, Tasarımı ve Yürütülmesi.* (Çev. Ed. Dede, Y. ve Demir, S.B.) Ankara: Anı Yayıncılık.
- Çolakoğlu, M. H. ve Gökben, A. G. (2017). Türkiye’de Eğitim Fakültelerinde FeTeMM (STEM) Çalışmaları. *Journal of Research in Informal Environments (JRINEN)*, 3, 46-69.

- Çorlu, M.S., Capraro, R.M. & Capraro, M.M. (2014). Introducing STEM education: Implications for educating our teachers in the age of innovation. *Education and Science*, 39(171), 74-85.
- Çorlu, S., Capraro, R.M., & Çorlu, M.A. (2015). Investigating the Mental Readiness of Pre-service Teachers for Integrated Teaching. *International Online Journal of Educational Sciences*, 7(1), 17-28.
- Dugger, E. W. (2010). Evaluation of STEM in the United States. 6th Biennial International Conference on Technology Education Research. Australia.
- Gonzalez, H. B., Kuenzi, J. J. (2012). Science, technology, engineering, and mathematics (STEM) education: (CRS Report No. R42642). Congressional Research Service website: <https://fas.org/sgp/crs/misc/R42642.pdf> adresinden 18.04.2017 tarihinde erişilmiştir.
- Hacıömeroğlu, G., Bulut, A.S. (2016). Integrative Stem Teaching Intention Questionnaire: A Validity and Reliability Study Of The Turkish Form. *Journal of Theory and Practice in Education*, 12(3), 654-669.
- Kırılmazkaya, G. (2017). Sınıf Öğretmeni Adaylarının FeTeMM Öğretimine İlişkin Görüşlerinin Araştırılması (Şanlıurfa Örneği). *Harran Education Journal*, 2(2), 59-73
- Langdon, D., McKittrick, G., Beede, D., Khan, B., Doms, M. (2011). STEM: Good Jobs Now And For The Future. http://www.esa.doc.gov/sites/default/files/stemfinalyuly_14_1.pdf adresinden 12.02.2017 tarihinde erişilmiştir.
- MEB. (2016a). PISA 2015 Ulusal Raporu. Ankara: Ölçme, Değerlendirme Ve Sınav Hizmetleri Genel Müdürlüğü.
- MEB. (2016b). TIMSS 2015 Ulusal Matematik ve Fen Bilimleri Ön Raporu. Ankara: Ölçme, Değerlendirme Ve Sınav Hizmetleri Genel Müdürlüğü.
- NRC (National Research Council) (2012). A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas. Washington, DC: The National Academies Press. doi:<https://doi.org/10.17226/13165>.
- OECD Education at a Glance (2017). Where will tomorrow's science professionals come from? 23 Aralık 2017 tarihinde <http://www.oecd.org/edu/education-at-a-glance-19991487.htm> adresinden erişilmiştir.
- Sanders, M. (2009). Stem, stem education, stemmania. *The Technology Teacher*, 68(4), 20-26.
- Teddlie, C., & Tashakkori, A. (2009). Foundations of mixed methods research. Thousand Oaks, CA: Sage.
- Toulmin, C. N., & Groome, M. (2007). Building a Science, Technology, Engineering, and Math Agenda. In: National Governors Association. <https://files.eric.ed.gov/fulltext/ED496324.pdf> adresinden 02.03.2017 tarihinde erişilmiştir.
- Wang, H. (2012). A New era of science education: science teachers' perceptions and classroom practices of science, technology, engineering, and mathematics (STEM) integration. (Doctoral dissertation). Proquest veritabanından erişilmiştir. (3494678).
- Wells, J. G. (2008, November). STEM education: The potential of technology education. In 95th Mississippi Valley Technology Teacher Education Conference, St. Louis, MO (Vol. 41).
- Yıldırım, B. ve Selvi, M. (2016). Examination of the effects of STEM education integrated as a part of science, technology, society and environment courses. *Journal of Human Sciences*, 13(3), 3684-3695.
- Yıldırım, A. ve Şimşek, H. (2013). Sosyal bilimlerde nitel araştırma yöntemleri. (Beşinci Baskı). Ankara: Seçkin Yayıncılık.

Proactive Effects Of Continuous Improvement And The Parkinson's Law On Management Function Problems*

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Abstract

Reactive and extreme bureaucratic organizations are in need of change. The reactive person is the waiter. He waits for things to happen and then reacts to the situation that results. The proactive person is the sharp one who anticipates the events that are about to happen and is ready with both a response and a plan to deal with the outcome. People who are aware of their surroundings and wish to avoid being taken by surprise by such things as odd job interview questions or negative results from medical tests will plan ahead, be wary, and try to forestall the worst of it by being prepared. Kaizen is a Japanese word for 'continuous improvement'. "One small step can change your life" is the gentle but potent way to effect change. "A journey of a thousand miles must begin with a single step. If the steps are small, the stress mechanism is quiet and the brain develops new habits from the repetition of small steps. The term "kaizen", also provides benefits in decision making. If someone has difficulty finding the purpose, the best Kaizen technique is asking a question each day, opening up the heart to hear the answer. Stress is an inevitable fact that's why there is stress management. Kaizen (small steps) and innovation (large steps) are both worthwhile strategies. Using big steps is fine but if the stress is too great or the motivation too little, Kaizen technique is necessary. Parkinson's law is a work that examines the results of rigid bureaucracy and rule in humorous dictionaries, especially in organizations. Parkinson mentioned that it is too long to fill in the time left for any job to be finished at all times. The first sign of organizational malaise is that it manifests itself in the organizational hierarchy of individuals who combine inefficiency and jealousy at a high level. None of these qualities are important on their own, but when they arrive at a certain density they react and bring a new self-name called "injelitance". Continuous improvement and the Parkinson's Law can contribute to the resolution of organizational problems by showing proactive behavioral impact.

Introduction

A vital characteristic requisite for success is an efficient management system. A company must plan, discuss, and assign roles to provide fluid leadership, embodied in the management system, during the course of doing business. The operation and use of the management system also have to be documented and broadcast throughout the company so that all employees know what part they have in its implementation. The management system must provide a clear focus on the competitive landscape, because competition largely drives a company's initial strategy, with the structure and design following the strategy. The competitive environment is critical to a company's survival in any market, so any management system must accommodate the particular nature of each market. Building an effective organizational management system involves consideration for people, automated systems, and the business as a whole. If a business is expected to grow financially and be a contributor to the welfare of the community in which it exists, it must be able to control itself successfully. Vital to that control is a system that integrates all stakeholders, all parts of the organization, and all aspects of the business functions. Company management must realize that a management system encompasses virtually the entire culture of the business and can affect the culture of the surrounding community (Şeneldir at all, 2017b; Tiller, 2012: pp.20-23). There are many problems in the organizational management systems. Some problems with strategic planning are: Frequent, conflicting suggestions from Board and/or employees; continual shortage of funds across the organization; low attendance and participation from Board and/or employees; poor results from products and services, conflict among Board members and employees about priorities, roles and responsibilities. Also some problems with teamwork are: Conflict between team members, inefficiencies in activities, high turnover of members, confusion about decision making and problem solving, poor performance among members, ineffective meetings, low morale (Kılıçaslan at all, 2018; Şeneldir at all, 2017a). Proactive behavior is first action, initiating behavior. The Kaizen strategy and the Parkinson's law have direct proactive effects on organizational issues. Planning, organizing, directing, coordinating and controlling; known basic management functions. The Kaizen Strategy and the Parkinson's Law are also influential on all management functions.

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Proactive Behavior Concept And Definition

Proactive behavior means letting people take initiative and assume personal responsibility for the value added to the customer, the quality of work and the work environment (Gong & Blijleven, 2017: p.534). Organizations need proactive employees who actively seek to “alter and improve their work environment” and seek to capitalize and “make things happen” that will lead to greater organizational outcomes (Parker & Wang, 2015; Ghitulescu, 2018; Wihler, et al., 2017). The most impactful employees are self-starting, forward-thinking, and willing to actively contribute (Aydin at all, 2017c; Aydin at all, 2018; Şeneldir at all, 2017c; Schmitt, Den Hartog, & Belschak, 2016). People are not able to simply be passive recipients of environmental constraints on their behavior and are no longer able to simply abide by job descriptions, policies and procedures, instructions and direction, and rules and routines. Rather, they must be able to intentionally engage and take initiative to directly change their current circumstances for the better (Crant, 2000). Proactive behavior is influenced by one’s belief in their ability to overcome constraints by situational forces and the ability to affect positive and beneficial changes in the environment (Bateman & Crant, 1993; Thomas, Whitman, & Viswesvaran, 2010). Proactivity or proactive behavior by individuals refers to anticipatory, change-oriented, and self-initiated behavior in situations. Proactive behavior involves acting in advance of a future situation, rather than just reacting or adapting. It means making things happen rather than just watching things happen or waiting for something to happen. Whereas adaptability is about responding to change, proactivity is about initiating change (Joo & Bennett, 2018: p.2).

Stress has been one of the focuses of studies in psychology because of its negative impact on people and their health. Cartwright and Cooper (1997) underlined the detrimental effects of stress that it can lead to many problems like emotional distress, stomach disorder, headaches, sleeplessness, loss of energy, and so on. Moreover, in the long term, it can be more serious illnesses such as high blood pressure and cardiovascular disease. While traditional stress research tends to emphasize the things that we can do when we get stressed, latest coping research focuses on taking actions that can be taken before stressful events occur. This became materialized especially after the new conceptualization of coping due to the influence of positive psychology movement (Peiro, 2007) and now it involves personal growth and self-regulated goal attainment strategies (Aydin at all, 2017a; Aydin at all, 2017b; Schwarzer & Knoll, 2003). Therefore, a new conceptualization of coping has been proposed by Schwarzer and Taubert (2002) as proactive and preventive coping which focus on a proactive, goal-oriented, and adaptive way of coping, as traditional coping models focuses on the reactive nature of coping only for the past and current stressors. However, proactive and preventive coping deal with anticipated, possible stressful situations which have not occurred yet. Therefore, these are future-oriented motivational higher order concepts. While proactive coping is defined as an individual’s efforts to go after achieving new challenges, create new opportunities, and enable promotion toward challenging goals; preventive coping is defined as the process where an individual construct resources and resistance toward the possible occurrence of stress in the distant future. Therefore the main purpose of preventive coping is just to be on the safe side while in proactive coping, is to further the situation to develop opportunities to grow and at the same time to be on the safe side (Ersen & Bilgiç, 2018: p.2).

Proactive Continuous Improvement

An active kaizen environment provides an organisation the means through which to integrate both the mental and physical and the necessary change management to create a dynamic organisation that is proactive and reactive to internal and external environmental changes. Within the organisation, proactive prevention activity and reactive problem-solving activity are possible through visual management tools and techniques. Production operating efficiency, quality and safety are continually improved through active tools, including analysis, feedback and clarification of operating methods. It is these tools that have been embraced by the West. As kaizen integrates the individual with operations and operations with the organisation, it becomes both pervasive and sustainable within that organisation. Workers tend to acknowledge kaizen as being both process-oriented and result-oriented, yet it is predominantly process-oriented. Kaizen serves different purposes for different people, being loose conceptual iterations of proactive change and improvement (Macpherson et al. 2015: pp.6-8).

Continuous improvement concerns the continuous effort of people to shift from reactive firefighting to proactive problem solving, and having the aim of relentlessly improving the execution and efficiency of processes in an ongoing manner. The Kaizen sessions conducted during each bilateral visit provide people with opportunities to discuss and communicate their ideas for improvement in an open and constructive manner. The Kaizen sessions are also the main formal channel for operational people to communicate their ideas across different managerial levels. In a research, those ideas are not only dedicated to the content of the information technology products to be developed, but also to personal efficiency and the processes of development. Those issues and the related actions are logged in a tool, which also contains information about the “action owners” and the feedback provided during a later stage about the results of the actions. During the Kaizen sessions, operational people proactively decide on the priorities of their work, together with their team members. Interviewees indicated that there is a cultural fit between the two factories. This is reflected by the similar proactive behavior of the people working in the factories.

Both organizations indicated that all employees involved in information technology outsourcing relationship know what their roles and responsibilities are. At the same time, employees of both organizations also have their own employee performance and satisfaction evaluation processes to proactively help people improve their work. Those instruments are companywide and also used in this information technology outsourcing relationship. This information technology outsourcing relationship has a reward mechanism in place to stimulate proactive behavior. Employees and teams are put in the spotlight in case an improvement is realized. Every year, the best-performing individual and the team within the partnership are rewarded with nonmonetary prizes. The best-performing team is always a mixed team that consists of people from both sides of the partnership. The purpose of Gemba walks is to proactively identify waste and opportunities for improvement. Knowledge from people involved in the partnership on how to improve the partnership is then extracted through leading with questions. Within the partnership, the daily stand-up sessions that are part of agile development are considered to be a 'light-version' of Gemba walks. During these sessions, the product owner, the scrum master, and the entire development team are present. The interviewees argued that the daily stand-ups boost the morale of the people involved in the partnership. People perform better if managers show genuine interest in the work performed, and when people know that their efforts are noticed and appreciated by their team and their managers. Within the partnership, the stand-ups are performed by the product owner, rather than executive management. While the respect for people and continuous improvement are relevant to knowledge accessing, systems thinking and proactive behavior facilitate knowledge integration and utilization (Gong & Blijleven, 2017: pp.533-539).

A new definition for Kaizen –“total continuous improvement (TCI)” was suggested in a research. The added term “Total” implies not only that everyone in the organization gets involved in continuous improvement, but also that every aspect of the organizational activities is subject to continuous improvement. Moreover, “Total” means a big picture of the whole organization and its environment. Kaizen is indeed a management philosophy which not only is clearly reflected in each of the three words – Total, Continuous and Improvement, but also results from the synergy created by the integration of these three concepts. To define Kaizen as TCI, rather than continuous improvement, signifies the importance of “Total” or “integration.” Each of the three words – Total, Continuous and Improvement – can be considered the philosophical foundation of Kaizen (Chung, 2018). PDCA Cycle, 8 Disciplines, Six Sigma DMAIC and 4Q Quadrants are among the continuous improvements methods.

Plan Do Check Act (Pdca) Cycle

PDCA cycle is the classic problem solving approach. PDCA cycle is targeted on the prevention of error repetition by creation standards and the ongoing modification of current standards. Using of the PDCA cycle means continuously improving process/product. It is effective in both doing a job and managing a programme. It is a fundamental concept of continuous improvement processes embedded in the organization's culture. The PDCA cycle enables two types of corrective action – temporary and permanent. The temporary is aimed at results by practically tackling and fixing the problem. The permanent consists of investigation and eliminating the root causes and thus targets the sustainability of the improved process. The most important aspect of PDCA lies in the “act” stage after the completion of a project when the cycle starts again for the further improvement. Product design corresponds to the planning phase. Production corresponds to doing-making, or working on the product that was designed. Sales figures confirm whether the customer is satisfied. In case of a complaint being filed, it has to be incorporated into the planning phase and action taken for the next round of efforts. (Sahno & Shevtshenko, 2014: p.182).

8 Disciplines (8d)

The 8D process was standardized during the Second World War by U.S. government, referring to it as Military Standard 1520: “Corrective action and disposition system for nonconforming material”. It was later applied by the Ford Motor Company in the 1960's and 1970's. 8D has become a standard in the auto and other industries that require a structured problem solving process, which is used to identify, correct and eliminate problems. The methodology is useful in product and process improvement. It focuses on the origin of the problem by determining root cause (Sahno & Shevtshenko, 2014: p.183).

Six Sigma Dmaic

Dating back to the mid of 1980s, applications of the Six Sigma methods enabled many organizations to sustain their competitiveness by integrating their knowledge of the process with statistics, engineering and project management. Motorola was the first company who launched a Six Sigma project in the mid 1980s. Six Sigma is a project-driven management approach intended to improve products, services and processes by reducing defects. It is a business strategy that focuses on improving customer requirements, business systems, productivity and financial performance. Utilizing analytical tools to measure quality and eliminate variances in processes allows to producing near perfect products and services that will satisfy customers.

4 Quadrants (4q)

4Q is data driven problem solving process for continuous improvement also called 4Q improvement methodology that was developed and applied in ABB company in 2009 to stop "religious" fights between Lean, Six Sigma DMAIC, PDCA, 8D and other promoters arguing superiority of one approach against the other. 4Q stands for the 4 quadrants: Measure, Analyse, Improve and Sustain. The 4Q process is a problem solving method similar to Six Sigma DMAIC.

The Parkinson’s Law And Proactivity In Management

Parkinson’s Law is the phenomenon of expansion of work to fill the time available for its completion. Parkinson’s law is attributed to British naval historian Cyril Northcote Parkinson who wrote about it in a satirical article published in The Economist in 1955. It was later reprinted in the 1958 book Parkinson’s Law or the Pursuit of Progress. Parkinson’s Law states “work expands so as to fill the time available for its completion.” If something must be done in a year, it’ll be done in a year. All projects take time-you certainly can’t build a skyscraper in a day, or a factory in a week. The more complex the project, the more time it typically takes-to a point. What would it look like if you finished the project on a very aggressive timescale? If you had to build a skyscraper in a day, how would you go about doing it? Answer the question the way you would a counterfactual, and you’ll discover techniques or approaches you can use to get the work done in less time (What is ‘Parkinson’s Law’? 2018).

Parkinson's Law's aim is to finish your work earlier be proactive. Deadlines are what give instant pressure to motivate us to work faster. Tasks don’t get done if there’s no deadline. So, once that deadline is set way too far from what the work really requires, you slack. For example, work can be compared to gas. Naturally, gas will take up the whole space. Their molecules will distribute randomly in space. So, if you give it a big or small container, it will take up the whole space of it. Like gas, work also expands and contracts. It depends on the time we allow for it (Parkinson’s law to increase productivity, 2018).

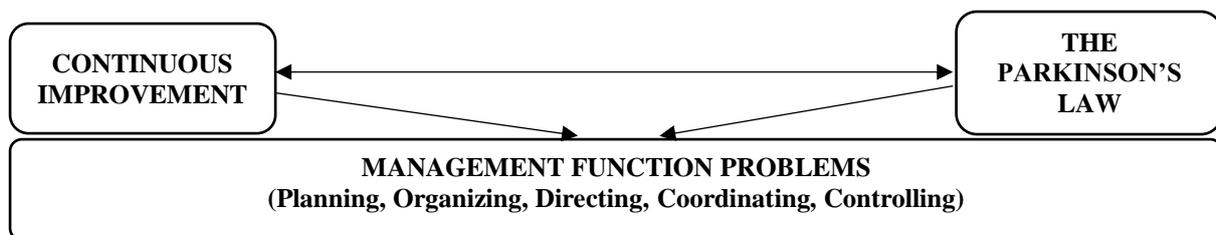
The reality of Parkinson’s Law is the more time passes before we take action, the more time that activity can spend in our minds haunting us, almost to a paralyzing state. How some people in the world are able to get so much done in a day and others feel completely overwhelmed with a significantly less workload? We all have the same amount of time in the day as Jeff Bezos, Oprah Winfrey, Kanye West or any other inspirational figure taking massive action in their lives. So what’s the difference in how they operate? These leaders know what’s most important and focus on it. Being able to focus on deep work is one of the most valuable skills a leader can develop. The work we create alone when uninterrupted is extremely important (Parkinson’s Law, 2018).

Parkinson’s Law means that inefficiency has been around for a long time, and procrastination only increases the work effort. If you have a long-term project that you have days, weeks, or months to complete, you should break it down into smaller projects. Each project should have its own specific deadlines. It's crucial that you set specific deadlines for all of your projects, whether they are long-term projects or projects that take just an hour or two to complete. It is important to set deadlines that are shorter than what you would usually give yourself.

The Effects Of Continuous Improvement And The Parkinson’s Law

Continuous improvement and The Parkinson’s Law are effective on management functions. Planning, organizing, directing, coordinating and controlling are basic management functions.

Figure 1: The effects of continuous improvement and The Parkinson’s Law



Parkinson's Law can also be used as a method of continuous improvement. For example, work expands to fill the available space. If you've got lots of room for a hospital lab, analysis machines will spread out over the space. It's designed to give people more room which causes more walking which causes delays which causes longer turnaround times. It is rational to allow the expansion of work to fill the existing space. In order to match the business and optimize the production, it is necessary to reduce the area. Customer satisfaction is thus increased (Arthur, 2008). The Parkinson Law, which can be used as a method of continuous improvement, prevents ambiguity in the planning phase. General recognition of this fact is shown in the proverbial phrase “It is the busiest

man he has time to spare.” Thus, an elderly lady of leisure can spend the entire day in writing and dispatching a postcard to her niece at Bognor Regis.

Regarding the organizing function in particular, Parkinson's Law is based upon two underlying laws: The law of multiplication of subordinates; and The law of multiplication of work. The basic theory is that an individual within a large administrative organisation will reach a point in their career where things start to get a bit ‘too much’ for them. Rather than leave the job or share it with anyone else, they make the case for acquiring subordinates. Subordinates will lead to more subordinates and eventually there is a department to manage. However, the quantity of real work hasn't actually increased very much. If the work hasn't increased that much, what to people do? Parkinson suggests that, “they read the memos they send each other”. In the modern world this would be the pointless emails that clog up work life? In the Colonial Office, between 1935 and 1954 the staff increased from 372 to 1661, over 400%. At the time the responsibility of the Colonial Office was declining, and by the time of the end of British Empire the Department had its highest number of staff ever – even with “certain areas being in enemy hands” (Bolton, 2011).

Regarding the directing function in management, it is used as a criticism against the inefficiencies of bureaucracies in large organisations. Parkinson's law refers to the tendency among people at work to finish their tasks only just in time for the deadline even though they are capable of completing it earlier. In such cases, an earlier deadline can push people to become more efficient.

Continuous improvement methods make management's coordination, control and other management functions more efficient. W. Edward Deming built his “scientific method” from many problem-solving theories, including Walter A. Shewart's “Specification-Production-Inspection” Cycle (Shewart, 1939). The Deming Wheel, first presented in 1950 at a seminar sponsored by the Japanese Union of Scientists and Engineers, consists of four steps: Design, production, sales and research. It then evolved into the PDCA Cycle and the PDSA Cycle (and some other variations). The various circles and cycles have been well adopted and adapted in the Kaizen movement.

Conclusion

In this study, it is examined that relations of The Kaizen Strategy and The Parkinson's Law with proactive behavior. Furthermore, how this kind of relations influences organizational problems are discussed. Continuous Improvement is a process that needs everyone in the organization to support. Continuous Improvement applies not only to top management but also to a person that is least involved in the company. It requires everyone consent and support. Instead of imposing solutions on the people, the company must use their expertise to improve them. If training, education and proper guidance is provided to them they improve at realizing the potential improvement areas where the product/process can be improved. And if proper structure is provided, these improvements can be turned into reality. Once continuous improvement process has been established in an organization it is everybody's responsibility in the organization that it must be maintained. Parkinson's law suggests that people try to maximize performance by taking the full time allotted to them even though doing so will hinder their productivity. Parkinson's Law predicts that more time will be spent on a task when more time is available. Parkinson's Law states that the amount of effort necessary to complete our work adjusts to fit the amount of time we allocate for it. In other words, Parkinson's law suggests that people try to maximize performance by taking the full time allotted to them even though doing so will hinder their productivity. In fact, a Stanford study confirmed that paradoxically, “the more hours you work, the less you get done”. The strong form of Parkinson's Law is obviously wrong because as time shrinks to zero the speed of work does not go to infinity. To pick but one example, limiting a novice pianist's practice time to less than a second does not make the novice learn to play that much faster. However, in its weak form Parkinson's Law predicts that more time will be spent on a task when more time is available.

Briefly, proactive coping provides an increment in work engagement and decreases burnout. Therefore, in terms of practical implications for organizations and managerial perspective, proactive coping can be very important in which the demand for jobs is because of its alleviating effect on the negative impacts of stress and additionally its role in increasing potential for growth and well-being. Therefore, managers should take notice of its positive effects on employees and invest in the promotion of proactive coping strategy in the organizations. As a result, Kaizen Strategy and Parkinson's Law contribute to the reduction of organizational problems by proactively acting.

Parkinson's Law prevents ambiguity in the planning phase. Regarding the organizing function in particular, it is based upon two underlying laws: The law of multiplication of subordinates; and The law of multiplication of work. Lots of people have a tendency to ‘empire build’, either consciously or sub consciously. Once you've got lots of people, they need something to do, so the work expands to fit the resources available. Regarding the directing function in management, an earlier deadline can push people to become more productive. Continuous improvement methods make management's coordination, control and other management functions more efficient.

References

- Arthur, J. (2008). "Parkinson's Law", Access Address:
<https://www.qimacros.com/lean-six-sigma-articles/parkinsons-law/>
- Aydın S., Of M., Kılıçaslan İ., Akça Ü., Kahraman K., Mutlu C. (2017a). Analysing of the Lecturer Practice at The Vocational School Mathematics. *Turkish Online Journal of Educational Technology*, SI, 284-287.
- Aydın S., Of M., Kılıçaslan İ., Akça Ü., Kahraman K., Mutlu C. (2017b). Teaching Abstract Mathematics in Vocational Schools: Teachers' Views. *Turkish Online Journal of Educational Technology*, SI, 15-19.
- Aydın S., Genel Y., Kahraman K., Tola Y., Of M., Mutlu C. (2017c). On the Level of Academic Achievement of The Vocational School Students: The Effect of Motivation. *Turkish Online Journal of Educational Technology*, SI, 653-657.
- Aydın, S., Genel Y. and Mutlu, C. (2018). Attitudes towards Online Web Assisted Learning: Business Management Students. *The Online Learning of Distance Education and e-learning*, 6(2), 34-40.
- Bolton, C. (2011). "Parkinson's Law 1. Work expands to fit the time available for its completion" (2011, 24 November) Access Address:
<https://whatsthepont.com/2011/11/24/parkinsons-law-1-work-expands-to-fit-the-time-available-for-its-completion/>
- Bateman, T. S. & Crant, J. M. (1993). The proactive component of organizational behavior: A measure and correlates. *Journal of Organizational Behavior*, 14, (pp.103-118).
- Cartwright, S. & Cooper, C. L. (1997). *Managing workplace stress* (Vol. 1). Sage.
- Chung, C.H. (2018). "The Kaizen Wheel – an integrated philosophical foundation for total continuous improvement", *The TQM Journal*, <https://doi.org/10.1108/TQM-03-2018-0029>.
- Crant, J. M. (2000). Proactive behavior in organizations. *Journal of Management*, 26, (pp.435-462).
- Eremenko, K. (2018). Parkinson's Law to increase productivity. (2018, 11 May). Access Address:
<https://www.superdatascience.com/podcast-parkinsons-law-to-increase-productivity/>
- Ersen, Ö. & Bilgiç, R. (2018). The effect of proactive and preventive coping styles on personal and organizational outcomes: Be proactive if you want good outcomes. *Cogent Psychology*, 5: 1492865,
<https://doi.org/10.1080/23311908.2018.1492865>
- Farooqui, R.U. & S.M. Ahmed. (2009). Maintaining a Focus on Continuous Improvement. *Seventh LACCEI Latin American and Caribbean Conference for Engineering and Technology*. June 2-5, Venezuela.
- Gong, Y. & Blijleven, V. (2017). The role of Lean principles in supporting knowledge management in IT outsourcing relationships. *Knowledge Management Research & Practice*, 15(4), (pp.533-541).
<https://doi.org/10.1057/s41275-017-0072-8>
- Joo, B.K. & Bennett, R.H. (2018). The role of proactivity and contextual factors in influencing creative behavior, commitment, and performance: evidence from a korean multinational, *Journal of International & Interdisciplinary Business Research*, 5(Art. 2), (pp.1-20).
- Kaufman, J. (2018). What Is 'Parkinson's Law'? (2018, 17 August). Access Address:
<https://personalmba.com/parkinsons-law/>
- Kılıçaslan, I., Aydın, S., Türkeri, K. and Soydaş, H. (2018). Attitudes towards Online Web Assisted Learning: Accounting and Tax Students. *The Online Learning of Distance Education and e-learning*, 6(2), 27-33.
- Macpherson, W.G., Lockhart, J.C., Kavan, H. & Iaquinto, A. (2015). Kaizen: a Japanese philosophy and system for business excellence. *Journal of Business Strategy*, 36(5), (pp.3-9). DOI: 10.1108/JBS-07-2014-0083.
- Moore, D. & Tenney, E.R. (2012). Time Pressure, Performance, and Productivity. *Research on Managing Groups and Teams*, 15, (pp.305-326).
- Parker, S. K. & Wang, Y. (2015). Helping people to "make things happen: A framework for proactivity at work. *International Coaching Psychology Review*, 10, (pp.62-75).
- Parkinson, C. (1955). Parkinson's Law. *The Economist*, November(19), (pp.635-637).
- Peiro, J. M. (2007). Stress and coping at work: New research trends and their implications for practice. In K. Na Swall, J. Hellgren, & M. Sverke (Eds.), *The individual in the changing working life* (pp. 284- 310). Cambridge, UK: Cambridge University Press
- Pencavel, J. (2015). The Productivity of Working Hours. *The Economic Journal*, 125(589), (pp.2052-2076).
- Sahno, J. & Shevtshenko, E. (2014). Quality improvement methodologies for continuous improvement of production processes and product quality and their evolution. *9th International DAAAM Baltic Conference*, 24-26 April, Estonia.
- Shewart, W.A. (1939). *Statistical Method from the Viewpoint of Quality Control*, Department of Agriculture, Washington, DC.
- Schmitt, A., Den Hartog, D. N. & Belschak, F. D. (2016). Transformational leadership and proactive work behavior: A moderated mediation model including work engagement and job strain. *Journal of Occupational and Organizational Psychology*, 89, (pp.588-610).

- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional and Social Intelligence Against Inertia. *Turkish Online Journal of Educational Technology*, SI, pp.229-234.
- Şeneldir, O., Kudu, M. Genel, Y, Akça, Ü., Soydaş, Aydın., S. (2017b). Types of Behavior in Businesses and Resistance to Individual Change. *Turkish Online Journal of Educational Technology*, SI, pp.843-848.
- Şeneldir, O., Aydın, S., Kudu, M., Kılıçarslan, İ., Of, M. & Mutlu, C. (2017c). Kaizen and Intuition in Stress Management. *The Turkish Online Journal of Educational Technology*, SI, pp. 345-349.
- Thomas, J. P., Whitman, D. S., & Viswesvaran, C. (2010). Employee proactivity in organizations: A comparative meta-analysis of emergent proactive constructs. *Journal of Occupational and Organizational Psychology*, 83, (pp.275-300).
- Tiller, S.R. (2012). Organizational Structure and Management Systems, *Leadership and Management in Engineering*, 12(1), (pp.20-23).
- Udell, J. (2018) Parkinson's Law. (2018, 3 January).
Access Address: <http://artofamanager.com/2018/01/parkinsons-law/>
- Wihler, A., Blickle, G., Ellen, B. P., Hochwarter, W. A. & Ferris, G. R. (2017). Personal initiative and job performance evaluations: Role of political skill in opportunity recognition and capitalization, *Journal of Management*, 43, (pp.1388-1420).

Problems And Trends In South Korean Lifelong Education

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Abstract

This paper focused on the characteristics, problems and trends in Korean lifelong education policy. Major Characteristics of the Korean lifelong education policy are seen as government's leadership, program provisions focusing on humanities and cultural refinement, high rates of participation in lifelong learning, insufficient policy-making from the learners' point of view, role of NILE as a flagship policy implementation agency, and evidence-based plan and research. Furthermore, SWOT analysis, a strategic planning method used commonly with a broad range of projects or initiatives, was performed on the Korean lifelong education policy. Finally, for the improvement of lifelong education some suggestions were made, for instance, it is required to emphasize public awareness, promotion and the development of cultural sensitivity, to diversify the sources of education programs, to build networks between them, to maintain a balance between educational opportunities for the rich and the poor, and to establish a nation-wide recognition and validation system for the outcomes of adult and lifelong education.

Introduction

It has not been an easy task to build a nation-wide lifelong learning and education system given the historical and socio-economic context of Korean society. The initiative was initiated while the country's education experts were still concerned with school education as the next-generation visions and the people were more focusing on providing formal education to their children and supporting them get ready for entrance exams, rather than pursuing the realization of their own needs for lifelong learning. In short, the overall climate, historical and cultural tradition and socio-economic basis of the country were less than perfect advocates of lifelong learning and adult education policies to bring the agenda to the spotlight of policy-making and to start building a feasible system. Nevertheless, Korean society has performed a progress for itself from a social education-oriented state to a lifelong learning oriented stage. The society is also in the process of refining the transition in the form of a nation system. Korea is performing its transition from a literacy-challenged country into a lifelong learning-leading one. Behind the transformation lies a contributing factor that was the remarkable development of school education and diffusion of higher education among Koreans. In virtue of continued growth of adult education and common integration of lifelong learning, Korean society is striving yet another leap forward to get development as a lifelong learning society.

Building a policy framework for adult education in the acute circumstances and improving it towards the ultimate policy goal of creating a lifelong learning society has not only compromises made in real terms, but also required strategies rested on unconventional methodology. That the country has created tangible outcomes and systems out of its lack of preparation indicates that its lifelong education policy strategy has been in association with its diffusion of school education. Namely, the course in lifelong education policy that Korea has taken was not the best option essentially; it was rather a second-best choice based on real-life considerations. Thus, one should find strategic significance not in the course itself but in the dynamic interactions between internal and external conditions, circumstances and environments that have forced the country to take such a course.

Characteristics Of Lifelong Education In Korea

The characteristics of the Korean lifelong education have carried out both as policy-promoting factors and potentially compromising ones that forbid the country attaining further development in lifelong learning. Some of the major characteristics of the Korean lifelong education policy development are summarized as follows.

Government's leadership, implementation agencies and legal systems

Among countries around the world that have reported on adult learning policies, only about half have indicated adult education as an independent national policy-making plan. Even these countries are not implementing policies through separate, independent adult education laws. Instead, they are utilizing special provisions included in their education law. Mostly, their adult education policies are performed as provisional programs, requiring a broad structure, budgets and legal support. However, Korea has made adult education as part of its leading action for encouraging a lifelong learning framework legal and clearly installed implementation organizations and long-term policy plans (UNESCO UIL, 2010).

Many countries choose a top-down bureaucratic style of centrally-managing adult education funds granted from international development organizations or overseas ODA. They have various impressive highest-ranking commissions and committees that stand only in name. Moreover, their comparatively tight-budgeted local governments have no choice but to rely on their central government's national organizations for survival. Thus, it is very difficult to implement regionally-sensitive adult education policies (Ahmed, 2009). In comparison, Korean adult education policy is led by clearly defined leadership by the central government and is supervised based on a conciliatory approach that at the same time recognizes the regional implementation systems and demands regional initiatives and matching funds. In spite of the obvious leadership by the central government, actual programming and performance evaluations are performed out by the leadership of local governing bodies. By reason of higher power by local governments in securing budgets than the one by the central government, a bottom-up approach in policy development and benchmarking is prevailing.

program provisions focusing on humanities and cultural refinement

In most countries, adult education is pursued with regard to two goals, vocational ability development and social integration, with a tendency to put more emphasis on the former. Adult education policies concentrating on human resources development are gaining in particular strong impetus. Private capital is merging with public capital to take part in education sector and create an immense adult education and training market (Medel-Anonuevo, 2003). However, in Korea adult education and adult training are separated, and the learners' participation in non-vocational education (in terms of rates and number of hours invested) is higher than their involvement in work-related training. One of the reasons of these phenomena is that the country still has relatively lower employment rates compared to other advanced countries, and thus stay-at-home mothers and other non-working demographic groups enjoy participating regularly in non-vocational adult learning.

In contrast, the active working populations are subjected to the nearly universal lack of time and money to spend on learning other than compulsory education. Also, in Korea, there is not enough sufficient connecting system between vocational training and academic diploma which is regulated by the Ministry of Education and the Ministry of Employment and Labor respectively. The former mostly handles the supervision of academic ability-related programs, complementary education programs, the establishment of academic certification systems for adult learning outcomes, and the implementation of educational support projects for lower-income learners and etc. On the contrary, the Ministry of Employment and Labor independently implements vocational training and work-skill development programs under the certification framework.

High rates of participation in lifelong learning

Countries around the world can be divided into four groups correspondingly their people's level of participation in lifelong learning. Group A consists of countries (mostly Northern European states) that top 50% participation rates. Group B includes countries showing 35-50% participation rates, including Anglo-Saxon countries and some European states (Austria, Luxemburg, the Netherlands and Switzerland). Group C consists of mostly Eastern European countries, several Southern European states and emerging countries in Asia with a 20-35% participation rate. Lastly, Group D includes countries with less than 20% participation rates, such as Eastern/Southern European countries (Portugal, Greece and Poland), South American countries and the majority of countries in the rest of the world (UNESCO, 2007). Korea belongs to Group C, likewise similarly performing countries in terms of participation rates - e.g., the Czech Republic, Spain and Australia. Interestingly, when considering per-capita income, which has a correlation with the rate of lifelong learning participation, European countries with a similar level of national income have all shown lower participation rates than that of Korea. Taking that fact into account, Korea's lifelong learning participation against its per-capita income is considered to be relatively high (Han, 2010).

Insufficient policy-making from the learners' point of view

It can be allowed that Korea has built, supplied and expanded a lifelong education program led by strong public initiatives, and has encouraged the socially weak to participate in learning. Instead, there has been very little support for improving conditions that will be more inductive to learning as seen from the learners' point of view. For example, paid or unpaid vacation for learning is more or less not very common in Korean society. Funding for learning is available through only a handful of circumstances including vocational skill development and practical training. As a whole, lifelong learning policy as a means to supply education is being actively put into place on the national and local government and private levels. Notwithstanding, this relatively insufficient support is ready for use in practical matters, such as funding to directly promote learners' participation as in the number of hours spent in learning, educational expenses and increased access to opportunities to get learning. Evaluation of the policy implementation discloses one distinct characteristic of the Korean lifelong education policy. That is the imbalance existing between support for education supply and support for learner demands.

Role of NILE as a flagship policy implementation agency

There are many countries, which have a semi-governmental agency(s) and/or government-funded private organization(s) that lead the countries' adult education and lifelong learning policies. For example, there is NIACE (National Institute of Adult Continuing Education) in England and Wales; ALA (Adult Learning Australia Inc.) in Australia; and DVV (Deutscher Volkshochschul-Verband) or the German Adult Education Association in Germany. Korea has a similar institution called the National Institute for Lifelong Education (NILE), which is being recognized as an agency representing the superiority of Korea's lifelong education program. NILE is producing competitive outcomes regarding planning, work scope and performance compared to its overseas counterparts. The biggest role of NILE is to present a blueprint for the country's future lifelong learning framework by establishing the Comprehensive Lifelong Learning Development Plan (CLLDP). Korea's Lifelong Education Act (LEA), which was amended in 2007, assists the central and metropolitan (city and provincial) governments to establish and update CLLDP to help promote lifelong learning and report to the Minister of Education on a regular basis. Having been updated twice over the past decade, CLLDP has fulfilled its mission of leading the lifelong education policy and its implementation along the long-term planning. The plan's latest edition divides adult education practice regarding a learner's developmental stages and prepares to start programs and legal systems that strive for achieving balanced growth between the stages (Presidential Committee on Education Innovation, 2007).

Evidence-based plan and research

In order to promote more scientific management of lifelong education policy, surveys and studies have been conducted. These were carried out by routinely compiling statistical data on the practice of lifelong education and giving surveys on adult learners' learning practices (Lengrand, 1979). Adopting the latest approach of evidence-based research and consequently providing reference data, the surveys and studies help identify the Korean people's lifelong learning patterns and can therefore provide a kind of infrastructure upon which the government could plan out detailed policies. The surveys started in 2007 and have been performed on a yearly basis since. This type of annual survey implementation is a slightly rare practice compared to many countries around the world.

Assessment Of Korean Lifelong Education System

In this paper, Korea's lifelong education policy was defined as an adult education policy that intends to establish a paradigm on the lifelong learning society. For the success of the policy, several considerations can be suggested. First, adult education programs should be provided and policies be offered to promote the participation of adult learners. Second, the policy should be subjected to reflection for its visions and prospects, and be permitted to define itself as it progresses conjointly society's development to a lifelong learning framework. Third, on the base of the visions, a more active initiative is required to build robust, organic networks between core education areas which include school and higher education, and non-core education areas like culture, employment and welfare. SWOT (Strengths, Weaknesses, Opportunities, and Threats) analysis, a strategic planning method used commonly with a broad range of projects or initiatives, was performed on the Korean lifelong education policy. The results are summarized below (Han, 2010).

Strengths

Lifelong education and learning in Korea is growing firmly based on the result of the country's solid public education and the signature, nation-wide enthusiasm for education. Specifically, now that the country has entered into a fully developed phase of disseminating higher education, educational planning may come to pass with highly educated learners as one of its main targets (Han, 2008). Also, the relatively equal opportunity in school education and the distribution system across the education sector contributes positively to the equal opportunity in adult education as well. Korea has a highly developed modern legal system that supports the continuing implementation of lifelong education policies, and government agencies that manage the policy implementation exclusively. Presently, there are only a few countries around the world that have both the lifelong education law and policy implementation system. Successful implementation cases are often found among the countries with exclusive agencies and legal programs besides the law and the system. There are quite a few lifelong education research groups and experts available in Korea, making it easier for the country to secure expertise in lifelong education policy. Having an sufficient group of lifelong education specialists is a phenomenon seen rarely in the world. That advantage greatly facilitates the connection and collaboration between higher educational institutions and implementation programs in Korea.

Weaknesses

The insufficient public investment in lifelong education is one of the biggest weaknesses. Public investments in adult education are very small compared with those in school education. School-aged children aged 6 to 18 get the most investment, while adults aged 20 to 65 receive the least amount of investment, which remains an obstinate trend that adult education is viewed as an "out-of-pocket" affair. Learning is understood in relatively narrow terms.

That is, it is considered as one of the social functions including developing leisure and pastime skills, securing employment and increasing cultural sensitivity rather than as part of the core task of human beings (i.e., development and growth over a lifetime). Namely, lifelong education is regarded not so much as a policy framework geared towards next-generation education reforms but more as the supply of education happening at some lifelong learning centers. Working hours of Korean employees are much longer than those of OECD member states. Thus, Koreans undergo a lack in time and money to invest in learning. Unfortunately, as household income and finance is affected by the global economic crisis, Korean adults' opportunities for aggressive personal development are decreasing, which leaves workers who are on the turning point of losing their jobs and possibly become depending on the national welfare system.

Opportunities

By reducing, and thus being mostly freed from the burden of having to provide basic literacy training to the people, Korea has been securing the infrastructure with which to satisfy the increasingly diverse needs for the lifelong learning of Korea's adults. The country's wide spread elementary, middle and high school education and very high rates of entering into higher education programs are contributing to the fast-extinct ratio of illiterate individuals in the society while at once they promote a large clientele enthusiastic about satisfying their strong needs for learning through a practice of lifelong learning. Korea is rapidly becoming an aging society. This is taking place in tandem with Korean society's fast-changing perception of lifelong learning and "re-designing" one's life. Many Koreans even plan their post-retirement years when still in early adulthood. They are also anxious more about their lives and engage more actively in initiatives geared towards developing post-retirement or old-age competency. Recently, Korea's academic certification system has begun restructuring as led by the Ministry of Education and the Ministry of Employment and Labor. This is contributing to the rising demand for certificates, licenses and permits and for ongoing education among Korean learners. Well-established academic certification system is known to help increase the need for learning. Korean society's demand for and awareness of arts, humanities and high-class culture programs are expanding. Increases in numbers living as part of the elite class with more money and time on their hands, as well as their need for prestige and luxury, are rapidly forming a new breed of learning markets (Han, 2000).

Threats

Korea's tradition of valuing academic degrees is obstinately viable. Therefore, lifelong learning in Korea confronts the risk of expanding an already "degree-obsessed" society by misusing the systems and programs created originally to realize a lifelong learning society as a secondary means to earn a college degree. Notwithstanding that Korea is expanding its public investment in lifelong learning with its public lifelong educational institutions growing at their maximum, the pace of growth falls short of the government's expectation. That gap, if remaining steadily, will likely be filled rapidly with for-profit education service providers. In that case, Korea's lifelong education system that has been established for years could be compromised and the division of Korean society may speed up according to the expanding market for lifelong learning.

Discussion: Suggestions For International Cooperation

Lifelong education can be carried out only on the stable foundation of basic public education. The development of general education through public education is the condition for the development and implementation of the lifelong education policy. It is important to set goals for the policy and to build independent bodies of related laws and regulations. The majority of successful instruments of implementation of the lifelong education policy have efficient authorities that independently manage the policy. Issues in lifelong education must be considered by policy makers are as follows: continuous initiatives in order to increase people's participation and the creation of a lifelong learning society - a new context and a concrete policy goal. Only efforts with vision can successfully lead the policy to build a lifelong learning society. It is required to emphasize public awareness, promotion and the development of cultural sensitivity in order to help expand people's participation in learning as it becomes more necessary to their daily lives. Moreover, it is needed that the sources of education programs should be diversified and networks between them should be formed. This is necessary in ensuring that adult education is well balanced efforts including literacy, humanities and cultural refinement, technical training and specialized education all within its sphere. A balance between educational opportunities for the rich and the poor should be maintained. Provided economic growth continues world-wide, demand for the former will lessen finally, whereas demand for the latter will continue to increase. The right time for a system-to-system transition is deeply related to the migration of the balancing point between these two types of education. It is also required, to establish a nation-wide recognition and validation system for the outcomes of adult and lifelong education.

As a whole, dynamics between learning and academic certification serves as the driving force behind the growth of adult education. Countries need to nurture and train lifelong education professionals with greater vigor and enthusiasm, and assign them first and foremost to public adult education programs. They act as the source that

enables the establishment of lifelong learning framework. No policy is successful without feasible data to back it up. Thus, countries should participate in surveying adult learners' participation in lifelong learning, like the one given on OECD member states, and should devote to their own statistical survey of lifelong education facilities. Macro indexes will add great power to building and implementing the policy.

References

- Ahmed, M. (2009). *The State and Development of Adult Learning and Education in Asia and Pacific: Regional Synthesis Report*. Hamburg: UNESCO.
- Han, S. (2008). The lifelong learning ecosystem in Korea: Evolution of learning capitalism? *International Journal of Lifelong Education*, 27(5), 517-524.
- Han, S. (2000). Korea's Lifelong Education: Development of Implemental Discourses and the Contestation. *The Journal of Lifelong Education*, 6(1), 1-20.
- Han, S. (2010). *Lifelong Learning and Adult Education Policy. Understanding Korean Educational Policy*. 10. Korean Educational Development Institute (KEDI).
- Lengrand, P. (1979). *Prospects of lifelong education. Lifelong education: A stocktaking*. A.J. Cropley. Hamburg: UNESCO Institute for Education.
- Medel-Anonuevo, C., Ed. (2003). *Lifelong learning discourses in Europe*. Paris: UNESCO.
- Presidential Committee on Education Innovation (2007). *Innovative Architecture for Learning Society in Korea*. Seoul: PCEI.
- UNESCO (2007). *EFA Global Monitoring Report 2008: Education for All by 2015 will we make it?* Oxford: Oxford University Press. 103.
- UNESCO UIL (2010). *Global Report on Adult Learning and Education*. Hamburg: UNESCO Institute for Lifelong Learning.

Problems Faced By Teachers Of Gifted / Talented Students

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Abstract

The purpose of this research is to identify the problems faced by teachers with gifted / talented children. The study was conducted in 2017-2018 academic year and includes the teachers of the children whose children are gifted / intelligent. In addition to the demographic information of the teachers in the study, the perspective of the society as a teacher with a talented / intelligent student, where the teachers helped the children to learn what they should do as a teacher with a gifted / talented student who had problems with themselves or other members of the family, It has been tried not to be determined through open-ended questions, whether there is a private center or institution that is continuing outside the Art Center, whether the students have received relevant guidance support, and what kind of support they need. The data were evaluated by the content analysis technique of the qualitative data analysis method. Nvivo 10 program was used for qualitative data analysis. As a result of the research, the problems experienced by the teachers of the gifted / talented students were determined and suggested solutions. They also tried to get an idea of what the problems would be in their research.

Key words: *Gifted, talented, teacher*

Introduction

It is known that those who direct the important developments in the world are highly talented individuals. While the development of gifted students in line with their abilities has advantages both in terms of themselves and society, it is a disadvantage that these students are not developed in line with their abilities. The lack of support for the positive features of students with superior ability may have some negative consequences for students with disabilities or gifted students. These negative behaviors can be mischievous, unresponsive to the school, unsuccessful, unspeakable jokes and speeches that will escape the peace of the class. Therefore, the identification of students with superior ability requires special knowledge and expertise. In the classroom environment where individuals with superior ability are present, the negative behavior of some of these children may lead to disciplinary problems in the classroom environment.

Ataman (1998) refers to gifted children as individuals with superior performance or intellectually superior to their peers in terms of mental abilities or intelligence, strong creativity as well as high sense of accomplishment in beginning work. In the I. Special Education Council, the "gifted" in terms of their general or special abilities are defined by their experts as being determined to perform at a high level according to their peers (MEB, 1991). Renzulli (1978), who stated that men and women of high talent had attracted the attention of people throughout history, speaks of the three talents of superior talents. These are talent above normal, relativity at higher levels and creativity at higher levels.

Highly talented students in education institutions continue their education together with their peers. By discovering these students, teachers can prepare enriched programs for these students and they can be directed to the Science and Arts Centers that provide education in the direction of the potential of non-school students in our country. The tests to determine gifted students take a long time and there are not enough number of guidance teachers to perform these tests. This is why teachers are not aware of their students' observations and experiences without labeling their students. The early identification of gifted students, their development in the direction of their abilities and the possible negative behaviors can be remedied by the teachers in the educational institutions knowing and directing the characteristics of these students. When the studies are examined, it is found that the teachers in the educational institutions are deficient in knowing the characteristics of the gifted students and determining these students (Alkan, 2013).

The identification of the problems experienced by gifted students and the opinions of teachers living in classrooms with them is important for the education of gifted students and the solution of their problems. With this in mind, the problems faced by teachers who directly observe the behaviors of gifted students in the research are examined.

- "What are the problems faced by teachers who are gifted students? Format. The following questions were searched within the framework of this problem.
- What kind of students do you consider to be special education?
- What special education groups did you belong to?
- What kind of features do students have in mind when it comes to gifted / talented students?
- Do you have gifted / talented students in your class? What distinguishes this student / student from other students?

- Are your gifted / talented students in your class experiencing problems in class / school (with other students or with you)?
- In your opinion, is the school environment sufficient to meet the needs of gifted / talented students? If not, what can be done?

Purpose Of The Research

In the scope of the study, it was aimed to reveal the problems encountered by the teachers who have gifted / intelligent knowledge to their students.

Method

In this section, information about research model, universe and sampling, data collection tool, data collection and analysis will be given.

Model Of Your Research

Survey screening model was applied. The main purpose of screening research is to describe the situation as it exists. Everything that is subject to research is tried to be defined as if it is within its own conditions (Karasar, 2005). The answers taken by teachers from open-ended questions constitute the screening part of the data.

Universe And Sampling

The universe of the research is composed of teachers who have gifted / intelligent knowledge to their students during 2017/2018 education period. The sample is composed of 54 teachers in various branches with a gifted / intelligent recognition to their students during 2017/2018 education period. The data were obtained by face-to-face interview with 54 teachers.

Data Collection And Analysis

In the research, the opinions of the teachers who have gifted / intelligent gifted to their students, scale questions prepared by the researchers and face to face interview method were collected. The scale consists of two parts. The first part consists of the items that teachers want to get demographic information and the second part consists of the difficulties they have with regard to having a gifted student. SPSS program and Nvivo 10 program were utilized in the analysis of the data.

Findings And Comment

- Demographic questions from the scale in this study consist of closed-ended questions. Teachers were asked open-ended questions about their views. Demographic questions were analyzed by frequency (quantitative) and open ended questions were analyzed by content (qualitative).
- Teachers' demographic characteristics
- Branches
- Vocational seniorities
- Educational status,
- The information on the education of children with special needs is given in the following tables.

1- Participant Branches

Table 1. Survey Branches

Participants Branches	Frequency	Percent
math	7	%13
The English	8	%16
Classroom Teacher	7	%13
Turkish	5	%9
Physical education	4	%8
Social studies	3	%5
science	6	%11
Religion culture	3	%5
Computer	2	%4
Visual arts	3	%5
Music	2	%4
PDR	3	%5
Pre-school	1	%2
Total	54	%100

As Table 1 reveals, most of the respondents are branch teachers.

2- Participant Professional Seniority

Table 2. Occupational Seniority

Participants Vocational Senior	Frequency	Percent
1-5	19	%36
6-10	19	%36
11-15	11	%20
16-20	0	%0
20-Top	5	%8
Total	54	%100

As seen in Table 2, the occupational seniority of teachers is mainly composed of the first 10 years of teachers. As a result of research conducted by Rash and Miller (2000) on the examination of the practices of teachers of gifted students, a positive correlation was found between the use of different methods as the duration of the teachers' professional experience and their work with gifted talents increased.

3-Educational Levels of Participant Teachers

Table 3. Teacher Education Levels

Teacher Education Levels	Frequency	Percent
License	38	%71
Graduate	13	%24
Doctorate	3	%5
Total	54	%100

Table 3 shows that the level of education of teachers at doctoral level is very low.

4-Are you trained in "special needs children" in university?

Table 4. Teachers Receiving Special Education

Special Education	Frequency	Percent
Yes	14	%25
No	40	%75
Total	54	%100

Table 4 shows that very few of our teachers have been trained in special needs children in university education. A study conducted by Hansen and Feldhusen (1994) with a study of trained and untrained teachers of gifted students shows that trained teachers for the training of gifted talents exhibit better teaching skills and a more positive classroom environment than untrained teachers for gifted talent. In this case, the teachers participating in the research show that they will have difficulty in solving the problems with special children. As a result of the questionnaire survey conducted by the Science Art Center in the process internal audit report (MEB, 2010), a large majority of respondents agree that the teachers in the schools do not have enough knowledge about the distinguishing features of gifted or gifted students.

5- Do you have in-service training about "children with special needs"?

Table 5. Teachers Receiving In-Service Training

In-service Training	Frequency	Percent
Yes	12	%22
No	42	%78
Collection	54	%100

Table 5 shows that very little of the teachers' special needs children are receiving in-service training. This shows that teachers have difficulty in solving problems with special children. Mills (2003) conducted a survey titled "Characteristic Characteristics of Effective Teachers in the Education of Gifted Children: Teachers' Past Experiences and Students' Personality Types" they do not have a certificate. The study of Nugent and Shaunessy (2003) on "Using Film in Teacher Training: Giftedness from Different Lenses" shows that the quality, social and emotional needs of the gifted students in the films after pre-service, in-service and after-service teachers' their parents' problems, the characteristics of their teachers, the availability of films related to available strategies, and the fact that these films are not used and used too much in teacher education.

As a result of the work titled "In-service Training Needs of Elementary School Teachers Related to Education" in Gültekin, Çubukçu and Dal, (2010), primary school teachers should be informed about student education, teaching planning, material development, teaching, managing teaching, It has been understood that they need training in all areas of competence, such as building, developing basic skills, serving special needs students, educating adults, having extracurricular activities, self-improvement, school development, and improving school-environment relationships.

6-What kind of students do you think are included in special education? The themes and sub-themes obtained from the answers given by the teachers in question.

Table 6. Themes and Sub-themes

Question	Theme	Sub themes
Which students do you understand as special education?	Children with intelligence back and forth 35%	Outstanding children Children above standard Children under the standard Those with developmental disabilities
	Different thinking 30%	Children with superior character Failed children Children who need individual attention Understanding children Children with high perception ability
	Gifted and disabled children 20%	Children with learning disabilities Failed children Mainstreaming students Children who need special attention and interest
	Children with learning strength 15%	Children out of normal education Children whose level of learning is different from normal students Mental retardation Autistic children Children with down's syndrome

As can be understood from Table 6, teachers have very different opinions in defining special children. It is understood from the above table that many teachers make literate definitions for special children, even though they do not receive education.

7-Which students belong to which special education groups? Themes and sub-themes of the answers given in the question.

Table 7. Themes and Sub-themes

Question	Theme	Sub themes
What special training group do you have?	Gifted 35%	Bilsem Student Going to the Children's University Special Education
	Mentally handicapped 20%	Light mental Middle Mental Advanced mental Having a learning disability
	Autistic 10%	Light Middle Advanced
	DEHB %5	Hyperactive Lack of attention

		Dyslexia
	Down %5	can learn can not learn
	No %25	Never met I do not know if I compared it I know these kind of students, Not in my class.

From Table 7, it can be seen that the most prevalent among the special children is the mentally retarded in the other group of gifted students.

8-Students who have what kind of characteristics are considered as gifted / intelligent students come to your mind, the themes and sub-themes related to the answers given in the question.

Table 8. Themes and Sub-themes

Question	Theme	Sub themes
What qualities do children have when it comes to gifted talent?	Quick on the draw 30%	Quick learner Academic success is high Easy to implement You can think of it as versatile
	Self-confident 25%	Trouble listening to lesson Academic failure is low Innovator Having new ideas
	Resolve problems quickly 20%	Quick thinking Different thinking Comment katan Who have their own truths
	Communication is weak 15%	Asocial Alone Incompatible Rebel and spoiled
	Analytical thinking and questioning 10%	Leader Insistent investigating detailed eye

The data in Table 8 show that teachers responded well to gifted students' behaviors they had shown. It is a promising future for the solution of problems of gifted children in the future. In a meta-study of Moore's (2009) study on teacher perceptions of academic superiority in elementary school classes, qualitative research has shown that teachers have a gifted education and positive thinking about identifying gifted children.

9-Are your gifted / talented students in your class experiencing problems in class / school (with other students or with you)? How is your approach to the problems you are experiencing? Themes and sub-themes of the answers given in the question.

Table 9. Themes and Sub-themes

Question	Theme	Sub themes
Do you have problems with your students? How do you solve it?	No problem 55%	I never met I did not live No problem
	I'm having a problem 35%	Attention Deficit (Warning, Motivation, Orientation, Different education, Empathy) Incompatibility (group work, help from guidance service, family discussion, referral to social activities)

	Self Confidence Explosion (Additional study, direction to research, preparation of presentation, project making)
Rarely 10%	Breaking the Classroom (Warning, Guidance, Parental Interview) Seeing yourself differently (Orientation in the direction of the ability to identify areas of interest)

In Table 9, the teachers are mainly given no answers. They either have trouble finding a solution or they may not want to expose problems because they are usually investigated in private schools.

10-Are your school environments sufficient to meet the needs of gifted / talented students? If not, how can it be done? Themes and sub-themes of the answers given in the question.

Table 9. Themes and Sub-themes

Question	Theme	Sub themes
Are the needs of talented students satisfied? What can be done?	Enough 25%	Out-of-school expert support can be better
	Partially Enough 30%	Teachers must be trained in these children There must be workshops for such children
	Insufficient 45%	Custom classes must be created Ensure environment for project work

An important part of the teachers in Table 10 states that school environments are inadequate for educational environments for gifted students. In this case, it can be said that our country needs to prepare enriched environments for these children, which is an important wealth in terms of human resources.

Conclusion And Discussion

Surveys were reached through face-to-face interviews with teachers working in various state and private schools of various countries. There are 54 teachers in various branches of the research. When the data from our teachers contributing to the study were analyzed, it was determined that most of our teachers were undergraduates and very few were trained in faculties where special needs children were taught and in in-service trainings. In this case, it was observed that our teachers could have problems with the behavior that they should exhibit when they meet children with superior ability. The answers to the qualitative questions of the research were carried out by qualitative analysis methods and it was observed that the teachers with gifted students who were diagnosed according to the answers to the questions had problems. They are hesitant about what to do to solve their problems and which organizations may apply. Teachers can not get the necessary support because of the limited number of institutions that can respond to their problems. Official and non-governmental organizations can be used to reach teachers by providing materials such as seminars, films, books, posters and brochures that will inform the teachers about the education of highly talented students. Raising consciousness training in all sections of the society on the issue of diagnosed children can be helped to overcome the problems of teachers who are aware of the fact that these children are very important values in terms of our country and have a talented student in their class. Educating high-gifted learners about how to behave towards these students, organizing appropriate training programs and preparing appropriate training environments can be an important step for the future of our country.

Suggestions

- Teachers with gifted students can introduce common skills of gifted children and gain the ability to cope with these characteristics.
- Teachers with gifted students can be trained to gain listening, communication, time management and social skills.
- Considering the common characteristics of gifted students, efforts to address the needs of organized education can be increased.
- Observed shortcomings of Science and Art Centers can be eliminated.
- Official and non-governmental organizations can be used to reach families by providing materials such as seminars, films, books, banners and brochures to inform parents about the education of highly talented students.
- Improvement of the school environment of gifted students can be done.

- Gifted students can establish workshops for schools to reveal the skills of students.
- For children with special abilities at the genius level, separate schools can be upgraded to an educational model. Depending on the facilities, such kind of schools can be opened in certain regions.

References

- Alkan, A.(2013). Öğretmenler için “Üstün Zekalı/Yetenekli Öğrencilerin Belirlenmesi Eğitim Yazılımı’nın geliştirilmesi ve Değerlendirilmesi. Doktora tezi, Gazi Üniversitesi, Eğitim Bilimleri Enstitüsü, Ankara.
- Ataman, A. (1998). *Üstün Zekâlılar ve Üstün Yetenekliler*. (Ed: Süleyman Eripek). Özel Eğitim, T.C. Anadolu Üniversitesi Yayınları, Eskişehir.
- Gültekin, M., Çubukçu, Z. ve Dal, S. (2010). İlköğretim Öğretmenlerinin Eğitim Öğretimle İlgili Hizmet İçi Eğitim Gereksinimleri. *Selçuk Üniversitesi, Ahmet Keleşoğlu Eğitim Fakültesi Dergisi, Sayı 29, Sayfa 131-152*.
- MEB, (1991). *I. Özel Eğitim Konseyi*. Milli Eğitim Bakanlığı, s.223-246, Ankara.
- Renzulli, J. S.(1978). *What Makes Giftedness Reexamining a Definition*, [http://www.mishawaka.k12.in.us/documents/HA%20docs/EDPS%20540%20articles/Module%201%20-%202026\(January%2026\)/Renzulli.pdf](http://www.mishawaka.k12.in.us/documents/HA%20docs/EDPS%20540%20articles/Module%201%20-%202026(January%2026)/Renzulli.pdf), 13.07.11 tarihinde erişilmiştir.
- Hansen J. B. ve Feldhusen J. F. (1994). Comparison of trained and untrained teachers of gifted students. *Gifted Child Quarterly, Vol. 38, No.3, Summer*.
- Karasar, N. (2005). *Bilimsel Araştırma Yöntemi*. (14. Baskı).Nobel Yayın Dağıtım, Ankara.
- Rash, P. K. And Miller, A. D. (2000). A survey of practices of teachers of the gifted. *Roeper Review, Vol. 22, Issue 3*.
- MEB, (2010). *Bilim ve Sanat Merkezleri Süreçleri (Üstün Yetenekli Bireylerin Eğitimi) İç Denetim Raporu*. T.C. Milli Eğitim Bakanlığı İç Denetim Birimi Başkanlığı
- Mills, C. J. (2003). Characteristics of effective teachers of gifted students: teacher background and personality styles of students. *Gifted Child Quarterly, Vol. 47, No. 4, Fall*.
- Moore, E. J. (2009). *Teacher perceptions of academic giftedness in elementary classrooms: A study of metaphors*. Ed.D., United States – Ohio, <http://search.proquest.com/docview/304863092?accountid=11054>, 30.08.11 tarihinde erişilmiştir.
- Nugent, S.A. and Shaunessy,E. (2003). Using film in teacher training: viewing the gifted through different lenses. *Roeper Review, Vol. 25*.

Process Model Of Intercultural Competence: A Self-Regulated Learning Perspective

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Abstract

To respect diversity, fostering intercultural competence among students is an important goal of public education, including universities worldwide. As valid assessments are lacking, the aim of the present paper is to introduce a new learning model of intercultural competence and to empirically test the theoretical structure of the model. In the Process Model of Intercultural Competence (PICO-Model), intercultural competence is conceptualized as a lifelong self-regulated learning task in intercultural situations. For this model, theories on intercultural competence were combined with theories on self-regulated learning. In the present study, 236 university students were assessed by the newly developed questionnaire. Analyses with MPlus validated the factor structure of the questionnaire and demonstrated the usefulness of the PICO-model and questionnaire for university students.

Keywords: *Self-regulated learning, intercultural competence, learning model, intercultural social work, university students*

Introduction

Fostering intercultural competence among students is an important goal of many degree programs offered at universities worldwide. Assuming that the development of intercultural competence is a lifelong self-regulated learning task, it is important to better understand the learning process of students in intercultural situations. To model the learning process in intercultural situations, theories on self-regulated learning were innovatively combined with state-of-the-art scholarly knowledge on intercultural competence development. The aim of the present paper is (1) to introduce a new learning model of intercultural competence and (2) to empirically test the theoretical structure of the model. Based on the new theoretical model, we developed a self-report questionnaire to measure the relevant determinants.

Models Of Self-Regulated Learning

Theories on self-regulated learning (Pintrich, 2003; Zimmerman, 2000a) conceptualize learning as an active and adaptive process of learners to reach their goals. In the model of self-regulated learning developed by Zimmerman (2000a), the learning action of a learner consist of three phases, each comprising necessary motivational and volitional constructs (see figure 1). In the first phase (= forethought phase), a learning action is initiated and planned. Based on the expectancy-value theory of motivation (Wigfield & Eccles, 2000), learners start to learn if they believe that they can be successful in performing a task (= expectancy component) and if they consider the task to be important (= value component).

In the performance phase, the execution of the learning action takes place. Thus, learning only remains attractive for learners when they also know HOW to learn successfully (Weinstein & Hume, 1998). To control and regulate their learning, learners need to use various cognitive and metacognitive strategies (Pintrich, 1999).

Finally, in the self-reflection phase, a functional assessment of the learning action happens, so that continued learning remains attractive in the future. Only persons who attribute success to their own merit and see failure as something that can be coped with and controlled will be able to maintain their appreciation for and expectation of success in the context of learning. Therefore, it is desirable that learners have a reference norm conducive to motivation, a functional style of attribution and strategies for how to deal with performance feedback (Weiner, 2005).

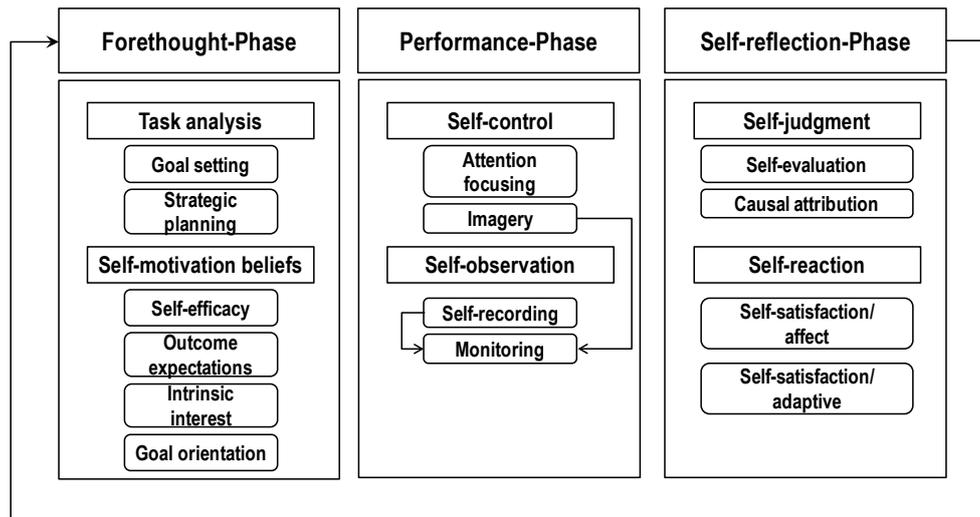


Figure 1. Model of Self-Regulated Learning (Zimmerman, 2000a)

Models Of Intercultural Competence

Acknowledging that social groups of any size can have their distinct cultures and that every individual belongs simultaneously to many different social groups, Barrett (2013) suggests applying an intergroup perspective to the concept of intercultural competence. According to the intergroup perspective, the context or the situation defines the importance of particular cultural affiliations. When cultural signs are salient and prompt individuals to shift their frame of reference, every situation can change from an interpersonal to an intercultural one.

In an intercultural situation, a huge number of key factors are considered as relevant for the development of intercultural competence. Common aspects of component models are three competence domains, namely (1) the knowledge domain, (2) the attitude domain, and (3) the communication domain. The knowledge domain includes aspects as knowledge about other cultures and subjects of own culture, knowledge about cultural similarities and differences, self-reflection, and personal development. The attitude domain includes aspects as empathy, openness, acceptance of inconsistencies, respect towards one's own and other cultures, and frustration tolerance. The communication domain contains aspects as communication skills, mediation skills, active engagement, and behavioural options (cp. Bolten, 2006; Erll & Gymnich, 2010; Spitzberg & Changnon, 2009; Ting-Toomey & Kurogi, 1998).

Although these models offer a useful structure to identify a multitude of personal characteristics, which are potentially necessary in an intercultural situation, they have also many shortcomings. The rather static view on "trait-like" personal characteristics of such models neglecting the dynamic, constructivist and developmental perspective of intercultural competence is a critical point (Hammer, 2015). Moreover, the lack of empirical validation of interconnections and causal pathways between the sets of cognitions, affects and behaviors suggested in the compositional models is problematic (cp. Barrett, 2013; Spitzberg & Changnon, 2009). Although there is a large number of measures available (Fantini, 2009), a review of available tests to assess intercultural competence (Matsumoto & Hwang, 2013) identified only three instruments which provided satisfying evidence regarding their underlying theoretical factors. Thus, there is still a need to develop theoretically sound measurements of intercultural competence.

To measure intercultural competence, we argue that it is important to shift the paradigm to the development of intercultural learning competence instead of conceptualizing intercultural competence as a trait-like personal characteristic. Such a paradigm shift offers several theoretical advantages. Most importantly, it implies that intercultural competence development is a life-long learning process (Deardorff, 2015). Consequently, any intercultural situation potentially offers new learning opportunities. Such a theoretical perspective also acknowledges that intercultural learning is a cyclical process, because learning actions follow each other as they are initiated, monitored and evaluated (for a similar approach see also Holmes & O'Neill, 2012).

Process Model Of Intercultural Competence

The Process Model of Intercultural Competence (PICO-Model) is an innovative combination of self-regulated learning theories and theories of intercultural competence, which acknowledges that intercultural competence is a cyclical learning process. Based on the model of self-regulated learning by Zimmerman (2000a), the development of intercultural competence in the PICO-model consist of three phases, the forethought phase, the performance phase, and the self-reflection phase.

In the *forethought phase*, learners (1) need to set their goals. Borrowing ideas from the composite models of intercultural competence (cp. Ting-Toomey & Kurogi, 1998), learners might want to improve their knowledge, attitudes or communication skills in an intercultural situation. For instance, they might wish to improve their knowledge regarding a particular country, their cultural perspective taking, or their ability to communicate. Thus, we theorize that from the perspective of the self-regulated learner the competence domains defined in the composite models of intercultural competence reflect potential learning goals in particular intercultural situations. The more learners aim to achieve particular goals during particular intercultural situations, the more their intercultural competence will develop over time.

Furthermore, learners will initiate a learning process in intercultural situations if they (1) believe that they can master the demands and they can influence things to their advantage, and if they understand their progress as evidence for their success. That means the learners need to have flexible implicit theories of learning, and a high intercultural self-efficacy and confidence in their own abilities (cp. Zimmerman, 2000b). Additionally, they need to be (2) interested in intercultural topics and their goal orientation should center on their personal development, that means high interest and a distinct goal of competence expansion (cp. Ames, 1990).

During the *performance phase* learners will (1) imagine their steps and instruct themselves how to proceed, (2) they are aware of and are able to manage their (negative) feelings, and (3) they show persistency especially when the situation turns out to be challenging. Learners (4) monitor and (5) record their behaviors, and (6) they try different strategies to find the most effective one. The PICO-Model assumes that the intercultural competence will improve over time depending on the frequency and quality of learners' strategy use during intercultural situations. During the *self-reflection-phase* competent learners will (1) evaluate their performance. After acting during an intercultural situation, it is helpful when the learners compare their performance with their initial goals. In both successes and failures, competent learners will ask themselves whether they put appropriate effort into the situation. When confronted with a failure, competent learners will analyze the situation to be able to identify aspects, which can be improved in future intercultural situations. Competent learners generally have a low level of feelings of helplessness but have plenty of ideas for adaptive reactions. The self-reflection-phase is also important for future performances. This is because the PICO-Model describes a cyclical learning process in which each reflection phase ultimately leads to the next *forethought phase* (cp. Strohmeier, Grading, & Wagner, 2017).

Empirical Study

The empirical study aims to test the theoretical structure of the model. In this study, we especially focus on the first phase of the self-regulated learning process, the *forethought phase* (see figure 2). We argue that the *forethought phase* is the most important learning phase because this phase comprises motivational beliefs necessary to initiate and plan an intercultural interaction. Heckhausen (1991) compared the *forethought* with "Caesar's step across the rubicon", that means, in this phase, the learners make the decision to start with the action phase of learning or not.

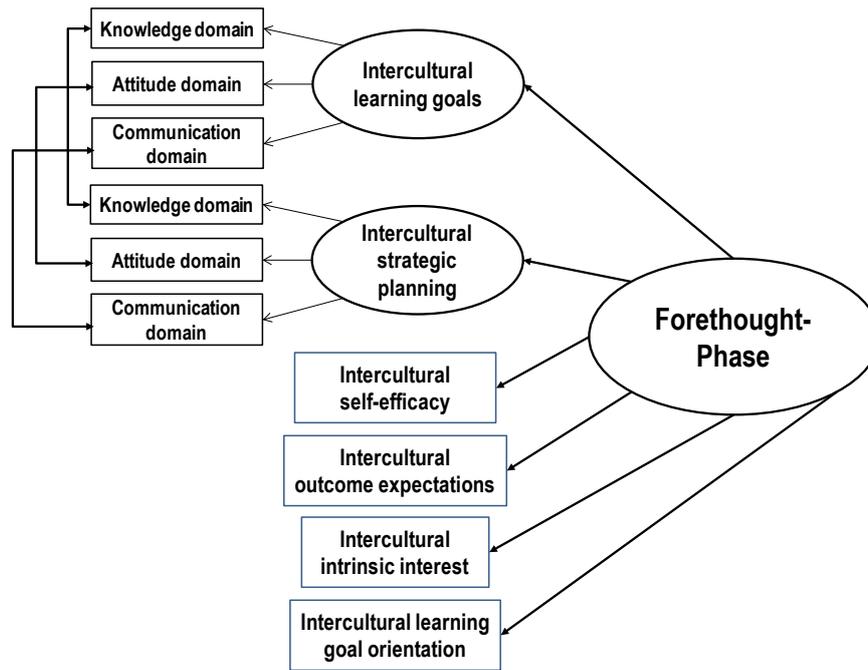


Figure 2. Process Model of Intercultural Competencies (PICO-Model) – Forethought Phase

Method

Participants

At the beginning of the academic year in 2012, all students (n=262) enrolled in either the bachelor or the master program of Social Work at the University of Applied Sciences Upper Austria were invited to participate in the study. Data collection took place during regular lessons at the University of Applied Sciences in the following week. The participation rate was very high (90%) and the final sample comprised 236 students; 169 students were enrolled in the bachelor program, and 67 students were enrolled in the master program. There were 188 women and 48 men aged 18 to 47 years (M=26.41, SD=6.19).

Measures

A self-report questionnaire was developed to measure the psychological constructs relevant in the forethought phase. Several items were newly developed or if available they were adapted from existing instruments. The whole questionnaire including all items can be found in the Appendix. A definition of intercultural competence was provided before participants were asked to answer the items: *Below we ask you some questions regarding your intercultural competence. Please think how you perceive yourself right now. The term “intercultural competence” can have different meanings for different people. In order to make it easier for you to answer the questions below, we provide you with a definition. Intercultural competence means that one’s own knowledge, feelings and actions are focused to act appropriately in intercultural situations.*

We omitted the term “effectively” in this definition because being effective is something very ambivalent in social work. Social workers usually intervene in rather challenging situations where acting appropriately rather than acting effectively is usually considered more important. The answer options for all items were a six point scale ranging from 0 "I fully disagree", 1 "I disagree", 2 "I rather disagree", 3 "I rather agree", 4 "I agree", and 5 "I fully agree".

Intercultural goal setting. We hypothesized that learners set priorities in three different domains before acting in intercultural situations (Bolten, 2006; Erll & Gymnich, 2010; Ting-Toomey & Kurogi, 1998).

Knowledge domain. Based on the composite models of intercultural competence, seven new items were developed (see table 1), e.g. "To improve my intercultural competence, I set myself the goal to acquire a broad cultural and country-specific knowledge."

Attitude domain. Based on the composite models of intercultural competence, five new items were developed (see table 1), e.g. "To improve my intercultural competence, I set myself the goal to improve my ability to better understand others' feelings."

Communication domain. Based on the composite models of intercultural competence, four new items were developed (see table 1), e.g. "To improve my intercultural competence, I set myself the goal to improve my conflict resolution strategies."

Intercultural strategic planning. We hypothesized that learners strategically plan their intercultural learning in three different domains. Participants were asked the following question before they were presented with the items in the three domains: "Which procedures do you plan in order to improve your intercultural competence?"

Knowledge domain. Based on the composite models of intercultural competence, seven new items were developed (see table 1), e.g., "I plan strategically, how I can acquire a broad cultural – and country-specific knowledge."

Attitude domain. Based on the composite models of intercultural competence, five new items were developed (see table 1), e.g. "I plan strategically, how I can improve my ability to better understand others' feelings."

Communication domain. Based on the composite models of intercultural competence, four new items were developed (see table 1), e.g., "I plan strategically, how I can improve my conflict resolution strategies."

Intercultural self-efficacy describes the motivational believe in one's ability to reach intercultural goals, to continue an action and to put in some effort even if the circumstances are very challenging. Learners who have high levels of intercultural self-efficacy believe in their future successes and keep on trying even if they experience some drawbacks in intercultural situations. By modifying existing items (cp. Jerusalem & Satow, 1999), four items were newly developed (see table 1), e.g., "I can act interculturally competent even in difficult situations, if I make an effort."

Intercultural outcome expectations refer to belief that intercultural achievement is a changeable construct and one can improve his intercultural skills. Therefore four existing items (cp. Dweck, 1999; Schober, 2002) were adapted (see table 1), e.g., "It is not determined how interculturally competent I am; I can learn step by step and constantly improve myself."

Intercultural intrinsic interest is characterized by an unconditional and essential interest in the intercultural topic. Learners who have a high level of intercultural intrinsic interest think that developing their intercultural competence is an end in itself. By modifying existing items (cp. Schmitz, Perels, Bruder & Otto, 2003; Schiefele, Krapp, Wild & Winteler, 1993), four items were newly developed (see table 1), e.g., "My major goal is to improve my intercultural competence."

Intercultural learning goal orientation. Previous findings have consistently shown that learning goal orientation supports the self-regulatory process significantly better than an outcome goal orientation (cp. Dweck, 1999; Zimmerman, 2000a). We measured the intercultural learning goal orientation by three adapted items (cp. Dweck, 1999; Schober, 2002; see table 1), e.g., "My major goal is to improve my intercultural competence."

Data Analytical Strategy

All data analyses were carried out using Mplus 7. We computed measurement models (CFA's) to evaluate the construct validity of all constructs (Table 2), and a structural model on the factorial structure of the forethought phase (Figure 2). To evaluate the model fit three criteria were used: the chi-square test, the Comparative Fit Index (CFI; Bentler, 1990), and the root mean squared error of approximation (RMSEA; Steiger, 1990). Non-significant chi-square values indicate good model fit. However, because chi-square is known to be sensitive to sample size, CFI and RMSEA indices of fit were also important to examine. CFI ranges from 0 to 1.00 with values above 0.95 indicating good, values above 0.90 indicating adequate fit. RMSEA ranges from 0 to ∞ , with values below 0.05 indicating good, values below 0.08 indicating adequate fit. Maximum likelihood estimation using the MLR estimator of Mplus was implemented providing standard errors and test statistics that are robust to non-normality of the data and to non-independence of observations.

Results

Measurement Models

To establish the factor structure of all constructs, confirmatory factor analyses (CFA) were applied separately for each construct. As shown in table 1, all constructs showed satisfying construct validity (all CFA's > 0.90). Although the RMSEA's of two scales (outcome expectations, intrinsic interest) were higher than 0.08, no item was dropped for the subsequent analyses.

Table 1. Summary of the Confirmatory Factor Analyses

Variables	Items	α	Chi ²	df	p	CFI	RMSEA	SRMR
Forethought-Phase								
Intercultural learning goals – Knowledge domain	7	.72	24.38	11	.01	0.957	0.072	0.040
Intercultural learning goals – Attitude domain	5	.83	6.10	4	.19	0.995	0.047	0.020
Intercultural learning goals – Communication domain	4	.46	0.03	1	.88	1.000	0.000	0.002
Intercultural strategic planning – Knowledge domain	7	.80	17.96	11	.08	0.986	0.052	0.030
Intercultural strategic planning – Attitude domain	5	.87	7.37	4	.12	0.994	0.060	0.015
Intercultural strategic planning – Communication domain	4	.66	2.40	1	.12	0.991	0.077	0.020
Intercultural self-efficacy	4	.81	2.34	1	.13	0.996	0.075	0.011
Intercultural outcome expectations	4	.71	11.24	2	<.001	0.951	0.140	0.037
Intercultural intrinsic interest	4	.84	7.22	1	<.001	0.984	0.162	0.018
Intercultural learning goal orientation	3	.64	0.00	0	<.001	1.000	0.000	0.000

Structural Models

To construct the structural models, parcels (=scale means) were used. The means, standard deviations and bivariate correlations of all manifest variables are presented in table 2. Parcels are preferred for the consecutive analyses because, compared with items, parcels have superior psychometric quality that reduce both Type I and Type II sources of error but do not bias or otherwise inflate construct relations (for details see Little, 1997).

Table 2. Means, Standard Deviations, and Bivariate Correlations between the Study Variables

Constructs	M (SD) n=236	1	2	3	4	5	6	7	8	9
Intercultural learning goals – Knowledge domain (1)	3.84 (0.61)	-								
Intercultural learning goals – Attitude domain (2)	4.09 (0.71)	.48	-							
Intercultural learning goals – Communication domain (3)	3.67 (0.65)	.38	.42	-						
Intercultural strategic planning – Knowledge domain (4)	3.74 (0.72)	.71	.49	.33	-					
Intercultural strategic planning – Attitude domain (5)	3.98 (0.80)	.37	.78	.43	.57	-				
Intercultural strategic planning – Communication domain (6)	3.66 (0.76)	.32	.45	.77	.39	.54	-			
Intercultural self-efficacy (7)	3.45 (0.70)	.24	.12 ^{ns}	.20	.17	.08 ^{ns}	.20	-		
Intercultural outcome expectations (8)	4.38 (0.58)	.13 ^{ns}	.21	.13 ^{ns}	.13 ^{ns}	.13 ^{ns}	.13 ^{ns}	.05 ^{ns}	-	
Intercultural intrinsic interest (9)	3.89 (0.88)	.47	.44	.30	.45	.40	.30	.24	.37	-
Intercultural learning goal orientation (10)	3.70 (0.72)	.50	.47	.32	.52	.47	.30	.16	.23	.55

Note. All items range between 0 and 5. All bivariate correlations were statistically significant at $p < .01$ level, except the ones marked with ^{ns}.

In line with the theoretical model presented in figure 2, the *forethought phase* was constructed. The model consisted of two latent factors and four manifest factors and showed an excellent fit, $\chi^2(31) = 67.79, p < .01, CFI = .952, RMSEA = .072$. The three indicators of the two latent factors (goal setting & strategic planning) were allowed to correlate, because the items capture the same three intercultural domains and therefore their content domains are identical (see figure 3).

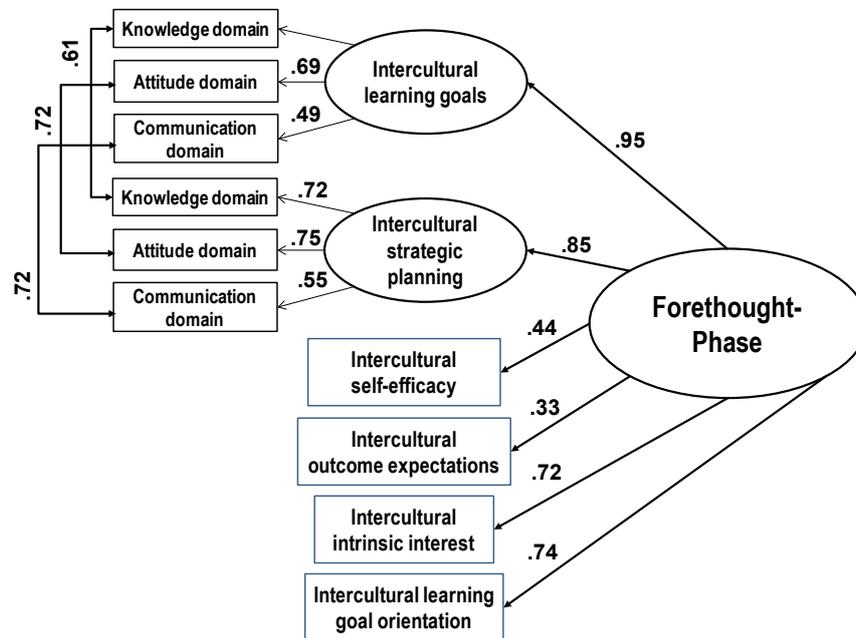


Figure 3. SEM Model: Empirical Structure of the Forethought-Phase (standardized estimates)

Discussion

Due to increased migration and mobility, intercultural competence has been becoming a key competence for many professions. To better understand the learning process of students in intercultural situations we developed a Process Model of Intercultural Competence (PICO-Model). Although many theoretical models of intercultural competence have been developed (cp. Spitzberg & Chanon, 2009), we are not aware of a model that conceptualized intercultural competence development from the perspective of self-regulated learning. Applying the self-regulated learning model by Zimmerman (2000a) a cyclical intercultural learning process was proposed. In this study, we investigated the first phase of the self-regulated learning process, the *forethought phase*. We hypothesized that an intercultural learning process is initiated when learners set themselves intercultural learning goals and plan their intercultural learning in three different domains (knowledge domain, attitude domain, communication domain) before acting in intercultural situations, when their intercultural self-efficacy, intercultural intrinsic interest, and, learning goal orientation are high and when they think that they can improve their intercultural skills (positive outcome expectations). To test these hypotheses we applied confirmatory factor analyses (CFA) separately for each construct. Based on cross-sectional data, the theoretical structure of the *forethought phase* was empirically validated.

Although all items were constructed relying on validated instruments and the structural validity of the new measures was rigorously tested, it should be kept in mind that self-assessments are only one possibility to investigate intercultural learning processes. Future studies could also collect data via learning diaries which could be completed before, during and after a series of specific real life intercultural situations. Alternatively, experimentally manipulated hypothetical vignettes could be applied. Both methods could be used to investigate the validity of the intercultural learning process across different intercultural situations and to examine the cyclical nature of self-regulated learning longitudinally. Moreover, replication studies with different target groups in other sub-cultures or other countries are recommended to rule out a possible ethnocentric bias inherent in the model.

References

- Ames, C. (1990). Motivation. What teachers need to know. *Teacher College Records, 91*, 409-421.
- Barrett, M. (2013). Intercultural competence: A distinctive hallmark of interculturalism? In M. Barrett (Ed.), *Interculturalism and multiculturalism: Similarities and differences* (pp. 147-168). Strasbourg: Council of Europe Publishing.
- Bentler, P. (1990). Comparative fit indexes in structural models. *Psychological Bulletin, 107*, 238-246.

- Bolten, (2006). Interkultureller Trainingsbedarf aus der Perspektive der Problemerkahrungen entsandter Führungskräfte [Need of intercultural trainings from the perspectives of manager's abroad with problem experiences]. In K. Götz (Ed.), *Interkulturelles Lernen, interkulturelles Training [Intercultural learning, intercultural training]* (pp. 57-75). München: Hampp.
- Deardorff, D. K. (2015). Intercultural competence: Mapping the future research agenda. *International Journal of Intercultural Relations, 48*, 3-5.
- Dweck, C. S. (1999). *Self-Theories: Their Role in Motivation, Personality, and Development*. Philadelphia: Taylor & Francis.
- Fantini, A.E. (2009). Assessing intercultural competence: Issues and tools. *The sage handbook of intercultural competence* (pp.456-476). Thousand Oaks, CA: Sage.
- Erll, A. & Gymnich, M. (2010). *Interkulturelle Kompetenzen – Erfolgreich kommunizieren zwischen den Kulturen [Intercultural competencies – Successful communication between cultures]*. Stuttgart: Klett Lerntraining.
- Hammer, M. R. (2015). The developmental paradigm for intercultural competence research. *International Journal of Intercultural Relations, 48*, 12-13.
- Heckhausen, H. (1991). *Motivation and action*. Berlin: Springer.
- Holmes, P., & O'Neill, G. (2012). Developing and evaluating intercultural competence: Ethnographies of intercultural encounters. *International Journal of Intercultural Relations, 36*, 707-718.
- Jerusalem, M. & Satow, L. (1999). Schulbezogene Selbstwirksamkeitserwartung [Self-efficacy expectations at school]. In R. Schwarzer & M. Jerusalem (Eds.), *Skalen zur Erfassung von Lehrer- und Schülermerkmalen [Scales for measuring teacher's and student's characteristics]* (p. 15). Berlin: FU.
- Matsumoto, D., & Hwang, H. C. (2013). Assessing Cross-Cultural Competence: A review of available tests. *Journal of Cross-Cultural Psychology 44*, 849-873.
- Little, T. (1997). Mean and Covariance Structures (MACS) Analyses of Cross-Cultural-Data: Practical and theoretical issues. *Multivariate Behavioural Research, 32*, 53-76.
- Pintrich, P.R. (1999). The role of motivation in promoting and sustaining self-regulated learning. *International Educational Research, 31*, 459-470.
- Pintrich, P. R. (2003). A motivational science perspective on the role of student motivation in learning and teaching contexts. *Journal of Educational Psychology, 95*, 667-686.
- Schober, B. (2002). *Entwicklung und Evaluation des Münchner Motivationstrainings (MMT) [Development and evaluation of Munich motivation training]*. Regensburg: Roderer.
- Schiefele, U., Krapp, A., Wild, K.-P. & Winteler, A. (1993). Der „Fragebogen zum Studieninteresse“ (FSI) [The Fragebogen zum Studieninteresse (Study Interest Questionnaire)]. *Diagnostica, 39*, 335-351.
- Schmitz, B., Perels, F., Bruder, S. & Otto, B. (2003). *Fragebogen Selbstregulation. Unveröffentlichter Fragebogen [Questionnaire Selfregulation. Unpublished questionnaire]*. Darmstadt: TU Darmstadt.
- Spitzberg, B. H., & Changnon, G. (2009). Conceptualizing intercultural competence. In D. Deardorf (Ed.), *The sage handbook of intercultural competence* (pp.1-52). Thousand Oaks, CA: Sage.
- Steiger, J. (1990). Structural model evaluation and modification: An interval estimation approach. *Multivariate Behavioral Research, 25*, 173-180.
- Strohmeier, D., Gradinger, P., & Wagner, P. (2017). Intercultural competence development among university students from a self-regulated learning perspective. *Journal of Psychology, 225*, 85-94.
- Ting-Toomey, S., & Kurogi, A. (1998). Facework competence in intercultural conflict: An updated face-negotiation theory. *International Journal of Intercultural Relations, 11*, 187-225.
- Weiner, B. (2005). Motivation from an Attribution Perspective and the Social Psychology of Perceived Competence. In A. J. Elliot & C. S. Dweck (Eds.), *Handbook of Competence and Motivation* (pp. 73-84). New York: Guilford Press.
- Weinstein, C. E., & Hume, L. M. (1998). *Study strategies for lifelong learning*. Washington, DC: American Psychological Association.
- Wigfield, A., & Eccles, J. S. (2000). Expectancy-Value Theory of Achievement Motivation. *Contemporary Educational Psychology, 25*, 68-81.
- Zimmerman, B. J. (2000a). Attaining self-regulation. A social cognitive perspective. In M. Boekaerts, P. R. Pintrich, & M. Zeidner (Eds.), *Handbook of self-regulation* (pp. 13-39). London, UK: Academic Press.
- Zimmerman, B. J. (2000b). Self-efficacy: An essential motive to learn. *Contemporary Educational Psychology, 25*, 82-91.

Appendix

Intercultural learning goals – Knowledge domain

To improve my intercultural competence, I set myself the goal to ...

1. ...acquire a broad cultural- and country-specific knowledge
2. ...engage as intensively as possible with one particular culture

3. ...learn a new language
4. ...acquire knowledge about cultural differences
5. ...acquire knowledge about cultural similarities
6. ... become more aware of my attitudes towards my own culture
7. ...become more aware of my attitudes towards other cultures

Intercultural learning goals – Attitude domain

To improve my intercultural competence, I set myself the goal to ...

1. ...improve my ability to better understand others' feelings
2. ...increase my open-mindedness
3. ...deal better with inconsistencies
4. ...respect other people even more
5. ...not give in immediately in difficult intercultural situations

Intercultural learning goals – Communication domain

To improve my intercultural competence, I set myself the goal to ...

1. ...discuss the way I talk when difficulties in communication occur
2. ...address unpleasant topics indirectly, if it is appropriate in the situation
3. ...address unpleasant topics directly, if it is appropriate in the situation.
4. ...improve my conflict resolution strategies

Intercultural strategic planning – Knowledge domain

I plan strategically, how I .can ...

1. ...acquire a broad cultural- and country-specific knowledge
2. ...engage as intensively as possible with one particular culture
3. ...learn a new language
4. ...acquire knowledge about cultural differences
5. ...acquire knowledge about cultural similarities
6. ... become more aware of my attitudes towards my own culture
7. ...become more aware of my attitudes towards other cultures

Intercultural strategic planning – Attitude domain

I plan strategically, how I .can ...

1. ...improve my ability to better understand others' feelings
2. ...increase my open-mindedness
3. ...deal better with inconsistencies
4. ...respect other people even more
5. ...not give in immediately in difficult intercultural situations

Intercultural strategic planning – Communication domain

I plan strategically, how I .can ...

1. ...discuss the way I talk when difficulties in communication occur
2. ...address unpleasant topics indirectly, if it is appropriate in the situation
3. ...address unpleasant topics directly, if it is appropriate in the situation.
4. ...improve my conflict resolution strategies

Intercultural self-efficacy

1. I can act interculturally competent also in difficult situations, if I make an effort.
2. It is easy for me to act interculturally competent in new situations.
3. Even when situations seem to be difficult at first sight, I still know that I can act interculturally competent, if I think through the situation properly.
4. I know that I can cope with challenges of an intercultural situation.

Intercultural outcome expectations

1. I am not very talented to act interculturally competent and I cannot really change that. (recorded)
2. Although I can learn new contents, I lack the talent to really understand how to act interculturally competent. (recorded)
3. It is not determined how interculturally competent I am; I can learn systematically and constantly improve myself.
4. I can improve my skills to act interculturally competent.

Intercultural intrinsic interest

1. It is important for me to act interculturally competent.

2. Intercultural competence is actually not important for me. (recoded)
3. Engagement with intercultural competence not one of my favourite activities. (recoded)
4. It is a pleasure for me to think and talk about how to act interculturally competent.

Intercultural learning goal orientation

1. My major goal is to improve my intercultural competence.
2. I feel to be successful when I get new ideas how to act interculturally competent in specific situations.
3. Regarding intercultural competence, my major goal is to learn many new things.

Professional Skills Development Of Rural Tourism Enterprises In The Baltic Sea Countries

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Abstract

Nowadays, tourism industry is significantly influenced by geopolitical processes. Due to the growing concerns of geopolitical instability, tourism flow to many so far very popular tourism destinations in Europe has significantly decreased. Changes in lifestyle also play an important role. There is an increasing demand for peaceful countryside idyll, bird watching, trying local specialties and participation in traditional arts and crafts workshops, which are just a few of activities that foreign guest wish to experience during their international travel tour, thus giving preference to visit the countries of Central Baltic Sea area – Latvia, Estonia and Finland – instead of many other attractive European travel destinations. Nevertheless, even as a region, the Central Baltic Sea countries are still quite unknown on the global tourism scale. Therefore, sustainable and well trained enterprise clusters with skills, knowledge and understanding how to enter new challenging markets such as Japan are required in the three Baltic Sea countries. Although the flow of Japanese tourists is annually increasing to Latvia, Estonia and Finland, specific knowledge and joint strategy to enhance cooperation with Japanese tourist agents are also necessary. Although rural tourism has a huge potential owing to specific natural and heritage culture potential in this region, most rural tourism enterprises here are small lifestyle farms and thus lack specific knowledge and market intelligence how to deal with cultural differences. In 2016, a new ambitious INTERREG Central Baltic project CAITO “Meta cluster for attracting Japanese tourism market” was commenced with active participation of the three countries of the Baltic Sea region. The overall objective of this project is to promote and support Latvian, Estonian and Finnish rural tourism enterprises to enhance cooperation with Japanese tourism market by strengthening capacity, mutual collaboration and tourism stakeholders’ coordination in the three Baltic Sea countries. The aim of the current research is to present the data obtained in scope of the project activities in particular focusing on marketing skills’ training. The specific research tasks are: 1) to characterize the attractiveness of the Baltic Sea region rural tourism product offered for Japanese tourists; 2) to analyse the needs of Japanese tourists in the Baltic Sea region countries and characterize the most typical market segments; 3) to identify current gaps in the public transport availability for Japanese travellers in rural areas of Latvia; 4) develop proposals for local entrepreneurs’ skills development to improve current rural tourism products and their marketing communication according to Japanese travellers’ expectations. The research employed monographic, desk study, statistical analysis, comparative analysis and in-depth interviews with rural entrepreneurs in Latvia.

Introduction

Asian tourism has been seen as a new potential growth market for Finland and the Baltic States for some time, and several national and regional tourism strategies count on this market. In previous years, Asian visitors have generally focused on the main tourist attractions and capital cities, but new products have attracted more interest in this market, in line with the worldwide trends in health, wellness and the natural environment. This creates new opportunities, especially for rural tourism, but not without its challenges. Rural tourism provision must meet Asian customers’ needs and demands, which may be sometimes problematic for the existing products. Therefore, to fully exploit this potential new market, companies often need to undertake development activities. This, in turn, assumes that businesses have knowledge of the behaviour of Asian tourists (Japanese tourists in..., 2016, p.5).

Today, the tourism industry in the Baltic Sea region contributes significantly to the economies of the countries in the region. However, the tourism industry in the Baltic Sea region, especially rural tourism that complies with sustainable development principles, needs a strong enhancement both on regional and European level addressing the opportunities and challenges of the industry. Politicians often underestimate the importance and impact of rural tourism on the overall economy and regional development of the countries. Target-oriented enhancement of rural tourism industry would help to eliminate regional disparities and create work places in remote rural areas, which is a particularly serious problem in Latvia and Estonia (Grinberga-Zalite et.al., 2017).

In 2016, a group of university scientists and representatives of rural tourism associations from Latvia, Estonia and Finland started INTERREG Central Baltic project CAITO “Meta cluster for attracting Japanese tourism market”. The project provides extensive cooperation in research and practical activities in Latvia, Estonia, southern part of Finland, and Japan. The overall objectives of the project are: to promote and support rural tourism companies to

enter Japanese tourism market by strengthening their capacity and cooperation in the three Baltic Sea countries. Specific objectives of the project are aimed at the following activities:

- 1) to explore the Japanese tourism market and the requirements for rural tourism in the Baltic Sea countries;
- 2) to develop a guide for rural tourism service providers about Japanese tourists' expectations and desires;
- 3) to organize training seminars for the rural tourism product providers about tourism product development opportunities aimed at Japanese tourism target market;
- 4) to promote rural tourism products for Japanese tourists in tourism fairs; elaborate and disseminate promotion materials and brochures; attract social media and bloggers, thus introducing Japanese tourism operators and media with rural tourism opportunities in Latvia, Estonia and Finland as well as developing a catalogue for tourism operators in Japan accordingly bringing together the proposed rural tourism products;
- 5) to organize decision makers' forums to identify existing problems that hinder, hamper and restrict Japanese tourists' wish to travel around Latvia, Estonia and Finland, as well as to find their solutions.

This will result in strengthened cooperation among the three countries' rural tourism enterprises, tour operators and travel agencies by reducing or preventing the potential risks and barriers to the Japanese tourists' visits, thus improving rural tourism products to attract larger number of tourists from Japan.

The project partners are Estonian University of Life Sciences (lead partner); Latvia University of Life Sciences and Technologies; Laurea University of Applied Sciences; University of Helsinki, Ruralia Institute; Latvian Country Tourism Association "Lauku celotajs"; Estonian Rural Tourism Association; Regional Tourism Association in Southern Finland "Visit South Coast Finland". The total budget of the project is 1 412 734.71 EUR, of which 85% is co-financed by the European Regional Development Fund.

The aim of the current research is to present the data obtained in the second phase of the project (2017-2018) revealing the latest trends regarding Japanese traveller attraction to the Baltic Sea countries and developing training programmes for rural tourism enterprises in the Baltic Sea Countries. The specific research tasks were: 1) to characterize the attractiveness of the Baltic Sea region rural tourism product offered for Japanese tourists; 2) to analyse the needs of Japanese tourists in the Baltic Sea region countries and characterize the most typical market segments; 3) to identify current gaps in the public transport availability for Japanese travellers in rural areas of Latvia; 4) develop proposals for local entrepreneurs' skills development to improve current rural tourism products and their marketing communication according to Japanese travellers' expectations. The current research is a continuation of the data analysis conducted within the initial phase of the project that is supplemented by the latest facts obtained within desk study, statistical analysis, comparative analysis and in-depth interviews with rural entrepreneurs in Latvia.

Increasing Interest Of Japanese Tourists In Rural Tourism And The Baltic Sea Countries

Compared to Central Europe and Western Europe, the Baltic Sea region is comparatively safer for tourism. Estonia, Latvia and Finland so far have not experienced natural disasters, war, strikes, or big events where people may act violently – these aspects are important. People are friendly but not pushy, which Japanese visitors appreciate. Shopping can be done without haggling, unlike in many Eastern countries. Availability of unspoiled nature landscapes, rich cultural heritage and high quality accommodation services and direct flights are highly important factors for Japanese tourists while taking decision of tourism destinations. Owing to direct flights from the largest Japanese cities to Helsinki provided by Finnair, there is an increasing trend of Japanese tourists arrival to all the three Baltic Sea Countries as due to long distances and high costs (travel to Europe costs ~4000EUR), 67% of Japanese tourists usually plan to visit more than just one country.

From marketing view point, travelling is satisfaction of hedonic needs and personal enrichment (self-actualization). The research data that were acquired by Latvian Country Association "Lauku celotajs" in 2016 from rural tourism guest houses and lifestyle farmers who had provided accommodation services for Japanese tourists give evidence that shopping and attending of crowded and polluted cities is not appealing for Japanese savvy tourists any more. Today they are rather looking for sophisticated personal enrichment activities, which are not shopping. Accordingly, popular tourism attractions offering very predictable and mainstream products many-to-many, which lately are losing their topicality compared to highly personalized and exclusive rural tourism niche products.

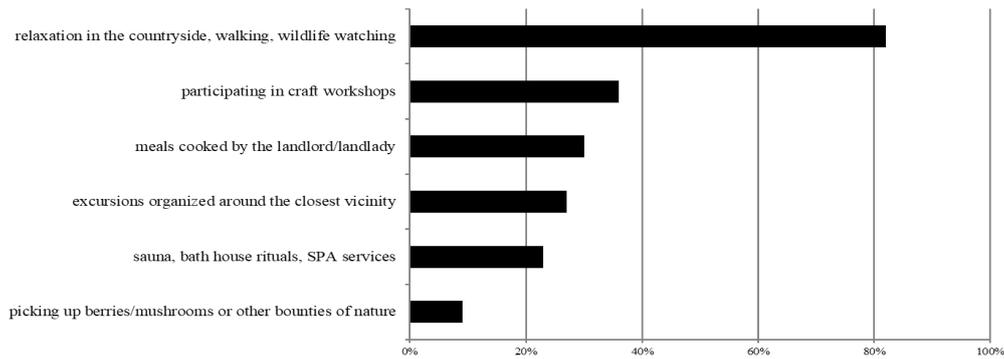


Fig. 1. **Most popular activities of Japanese tourists during rural tourism visits in Latvia, %**
Source: Latvian Country Association in-depth interviews with rural tourism service providers, n=34

Figure 1 reveals that peaceful countryside idyll, bird watching, trying local specialities and participation in traditional arts and crafts workshops are activities that foreign guests wish to experience, thus giving preference to visit the countries of Central Baltic Sea instead of many other attractive travel destinations. The analysis of aggregated data suggests that the most typical Japanese tourists' market segment in the Baltic Sea countries is senior couples (60+) who can be characterized as savvy seniors. For them, visiting the Baltic Sea countries is "must-see-in life" intention as they have already been almost in all most popular European tourism destinations, while the Baltics region only lately has become affordable destination for them owing to direct flights to Helsinki. Another important segment is males (40-50) who have business connections in the Baltics. Although business travel is their main priority, still politeness often requires from them to be informed of their business partners' country historical and cultural heritage. And finally, according to in-depth interviews with rural entrepreneurs in Latvia, the number of young Japanese women (20-30), so called "culture oriented girls" is also rapidly growing and is regarded as a very attractive market segment for rural tourism product. These female tourists are looking for sophisticated culture experience and interaction with unspoilt nature (organic, eco, raw etc.).

In authors' opinion, rural tourism has a wide variety of activities to offer for all the three market segments as all of them are both deliberately and unknowingly looking for "feel good" products, i.e. products that make the world a better place. Accordingly, collective intelligence (e.g. accumulating knowledge of collection and proper use of organic medicinal herbs), enhancing of animal welfare (responsible and caring animal husbandry), cultivation of environmentally friendly products, cooking technologies of healthy food as well as producing products that enhance society's integration (e.g. by employing blind people on the farm thus helping them to socialize and create something useful).

Rural Entrepreneurs' Professional Skills To Be Improved In Scope Of Marketing Mix Elements

According to marketing theory assumptions (Kotler & Keller, 2007; Simkova (2010)), there are eight marketing mix elements in tourism: product, price, place/distribution, promotion, people, packaging, programming and partnership, which all need to be well balanced and regularly updated in line with customers' needs. In the current research, the authors have analysed the gaps in Latvian rural tourism product within the above mentioned eight rural tourism marketing mix elements to identify areas for rural entrepreneurs' skills improvement, which will be integrated in specially tailored courses/seminars/guide-books developed in scope of CAITO project activities.

Place

To find out the viewpoints of foreign guests in the above mentioned countries regarding their experience of traveling by public transport, the partners of INTERREG Central Baltic Sea "CAITO – Meta cluster for attracting the Japanese tourism market" project group conducted structured interviews with a wide range of rural tourism stakeholders.

Tourists who have visited Latvia, Estonia and Finland admit that in the cities public transport system is good, various modes of public transport are optimally integrated to meet the needs of passengers. However, in remote rural areas the situation is not as optimistic – there is a need for more frequent trains/buses, and timetables of various modes of transport often are not integrated in a single system thus causing problems with travel planning. As tourists often wish to see as many sightseeing objects of one area as possible, it is highly important to have a well-planned route, which efficiently combines several modes of transport. Research results show that currently there are just a few internet sites available where travellers can obtain information about all transport services' providers, as each transport enterprise mainly provides information only about its own routes, thus travellers often have problems to combine routes of two or more different transport service providers. Moreover, buying tickets is another challenge as, unlike in most of cities, in rural areas traffic time-tables (directions, departure/arrival times) are available only in official language but not in English. A significant problem for travellers in Latvia is that, in

accordance with the Latvian State Language Law (Article 21 of the State Language Law), all information that is intended for the public and provided by state or local government institutions must be in Latvian only with a few exceptions (for example, information in international transport centres). In this respect, the authors conclude that currently it is very important to improve Latvian rural entrepreneurs' awareness of their duty to be ready to explain (in English language or in a pre-prepared written material) directions to Japanese tourists as well as convince them that without their assistance Japanese tourists can be exposed to serious risks (e.g. get lost, get a penalty for using public transport without appropriate ticket).

Product

Careful planning of a travel is highly important as paid vacation in Japan is only 10 days, thus all activities on the farm have to be precisely scheduled. The understanding of the most appropriate time for travelling for Japanese tourists is also necessary. Often Latvian rural entrepreneurs consider that Japanese tourists can be treated in the same way as other European tourists; however, it is not true. Unlike other European travellers, Japanese tourists are interested in travelling in autumn (September and October). Thus, this fact may extend the season, which is very important for Latvian rural enterprises. Moreover, most of all rural tourists from Japan value nature, landscape and the aurora borealis and they might also be modern humanists (experienced tourists) seeking experiences in exotic and unspoilt nature (forests, sauna, snow, walking on the ice) with local people.

Price

According to in-depth interviews, conducted in scope of the project activities, the average cost of European journey for a Japanese traveller consists of approximately 4000 EUR, which is expensive travel compared with other closer tourism destinations (Australia, South Korea), thus the high price must have appropriate justification (ability to visit several North Europe countries during the stay in Baltics, enjoy regional importance cultural events; ability to learn new specific methods of sustainable cooking, gardening etc.).

Promotion

The lack of Japanese web pages, Facebook pages and marketing material is a problem, especially in Latvia. This reduces visibility and awareness of rural tourism enterprises and travel packages. Moreover, for young generations Instagram is recommended. The authors' in-depth interviews with rural entrepreneurs revealed that lack of skills necessary for conducting digital marketing activities is one of most problematic aspects. Rural entrepreneurs are very interested to master these skills; however, digital marketing courses in Latvia currently are very demanded and thus too expensive for small life style farmers.

People

Rural tourism is definitely people-to people business. Therefore, interaction with customers is highly important and necessary. As many guest houses are run by lifestyle farmers who often are retired and thus are less motivated to improve their English language speaking skills to such extent as to be able to conduct practical workshops (e.g. cooking a traditional meal). Therefore, in scope of the project activities rural entrepreneurs should receive a special training material with most common conversation themes in English language, which could be easily mastered by everyone and used in everyday situations.

Packaging and partnership

These marketing mix elements, especially the element "partnership" are relatively new in marketing theory (Kotler & Keller, 2014); thus small local businesses are not fully aware of their necessity. Packaging tool can be understood as building of service packages, i.e. combining various products and services for which customers pay a total price so as to exactly match their wishes and requirements. A combination of related and complementary services forms a complex offer with which is very closely associated a content specification of programmes (programming) intended for various types of clients (different market segments). Creating service packages associated with specialized programmes is the most distinct tendency influencing the current development of tourism, including rural tourism (Pourova, 1999). If a customer buys rural tourism product package, it means that it is a set of several benefits – picking-up at the airport, shuttle services, reservation of a workshop activity, arrangement of an inter-city tour etc.). Therefore, rural entrepreneurs should be prepared to actively cooperate with other service providers, often their direct and indirect competitors, to provide the most appropriate and affordable in price set of activities to be offered for Japanese tourists. Very often small rural enterprises underestimate the benefits of being a member of a network (association, cluster, suppliers' organizations) as it initially seems as additional costs in the form of commission, membership etc. However, the new economy is a network economy (Rifkin, 2001), thus even members of such small sub-industries as rural tourism have to cooperate and look for opportunities how to build win-win relations with their direct and indirect competitors, suppliers and customer organizations. Consequently, partnership element is topical, too. In addition to the above said, rural tourism product is a "feel good product", which in the era of sustainable development is a product that can make the world a better place by promoting a healthy lifestyle, taking care of nature and animal welfare, cultivating healthy and locally grown food. However, in order to survive in the countryside, local businesses cannot implement same business strategies as large companies located in urban areas where businesses do not have seasonal character and

workforce availability is not a serious problem. Therefore, often partnerships with social entrepreneurs and NGOs can significantly support and enhance the success of the product offered by a small rural entrepreneur (Donovan & Henley, 2010). There are many good examples how rural entrepreneurs have become social entrepreneurs and built original and target oriented win-win partnerships with seniors' organizations, new mothers, disabled people etc., which consequently have added a unique social value to their product, thus making it much more attractive for customers who want to buy "feel-good" product instead of a mainstream commercial one giving only a short instant gratification.

Conclusions

The data obtained in Latvia, Estonia and Finland during the initial phase of the INTERREG Central Baltic project CAITO "Meta cluster for attracting Japanese tourism market" show that enhancing of cooperation among Finnish, Estonian and Latvian rural tourism agencies is of high importance in the interests of all the three Baltic Sea region countries both in terms of financial investments in rural tourism industry development and in information exchange. Enhancing of cooperation with Latvian Country Association and network of rural enterprises could enable Japanese tourists to enjoy even safer, more meaningful and diverse travel experience in the Baltics.

The next objectives of the CAITO project should be focused on conducting specially tailored training courses for rural tourism companies to better meet the needs of Japanese tourists. The most topical aspects that need to be integrated in these trainings are: digital marketing for small enterprises; English basics for hospitality industry; product development and market positioning for rural tourism enterprises as well as building networks within the industry. For this reason, project partners have to elaborate a special guide-book devoted to specifics of Japanese tourism market and recommendations for improvement of sustainable tourism products, which initially needs to be approved in each of the project countries to identify potential gaps in its content and afterwards should be prepared and distributed to rural entrepreneurs working with Japanese tourists in Latvia, Estonia and Finland.

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References

- Donovan, R., Henley N. (2010). *Principles of social marketing*. (pp.44-68). An International perspective. New York: Cambridge University Press (p.320). TarcherPerigee.
- Grinberga-Zalite G., Vitolina, Z., Rivza, B. (2017). *Knowledge and skills transfer for sustainable rural tourism in the Baltic Sea countries*. (pp. 350-354). Turkish Online Journal of Educational Technology. - Special Issue for INTE 2017 (November 2017).
- Kotler, P., Keller, K.L. (2011). *Marketing management*. (p. 816p). Pearson, 14th edition.
- Latvian State Language Law* (1991). The Saeima of the Republic of Latvia. Available: http://www.minelres.lv/NationalLegislation/Latvia/Latvia_Language_English.htm, retrieved: 11.08.2018.
- Pourova, M. (1999). *Agritourism business in the Czech Republic*. (pp.25-28). Acta Universitatis Bohemiae Meridionales 2(3).
- Suvanto, H., Sudakova, L., Kattai, K., Grinberga-Zalite, G., Bulderberga, Z. (2017). *Japanese tourists in Finland, Estonia and Latvia – a Literature Review*. (p.45). Helsinki, University of Helsinki. Ruralia Institute; Reports 166).

Promoting Active Learning Through Group Based Assessment Mixing Low And High Achievers In Group-Based Quizzes

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Abstract

The shift in the educational concepts from “teacher-centred education” to “student-centred education” led to the necessity of re-assessing teaching, learning and assessment strategies used in education. Active learning strategies are examples of the conceptual shift in education. Group based assessments are examples of active learning strategies that are believed to support this change in educational ideologies.

This study highlights the concept of active learning and group-based assessment through an experience of applying two different methods of group-based quizzes on fourth year students of architectural engineering program. The two methods are: quiz bowl, and sit group quiz. The study also tries to track the effect of the selected quiz methods on students’ academic progress through their performance in these group assessments as well as in the individual assessments. The output of this experience is compared to previous semesters in which only individual assessment strategies were applied. It is found that incorporating group based quizzes helps in boosting the academic progress of low achievers, and reducing the gap between low and high achievers.

Keywords: *Active learning; Learner-centered education; group-based quiz; quiz bowl; sit group quiz; low achievers; peer learning; student’s academic progress; Small Group Learning (SGL).*

Introduction

Context And Background

The change in educational concepts from a teacher-centred approach to a student-centred one has set the issue of class management as a continuous challenge facing teachers. Many studies have focused on this change in education and its effect on teaching, learning and assessment strategies as the corner stone in how the class is managed, and how the course is communicated to the students. The student-centred approach engages students in the education process and converts them from passive receivers of information set by the instructor into active learners. Many studies highlight the integration between teaching, learning and assessment (Gaudet et al., 2010; Simms and George, 2014; Carless, 2015). Gaudet et al. (2010) believe that Small Group Learning (SGL) may represent one of the most accessible methods for converting a classroom from a teacher-centred setting to an active learner-centred environment (p. 1). Mixed teaching approach, student’s involvement in education, peer learning, and group-based assessment are among many concepts that have been researched. Johnson et al. (1998) (as cited in Gaudet, et al., 2010, p. 8) compiled results from 305 studies on cooperative, competitive, and individualistic learning since 1924, and found that cooperative techniques were substantially better at promoting learning compared to the other two approaches.

This paper focuses on group-based quizzes as an example of group-based assessment strategies that are currently under research focus. The researcher tries to track the effect of such strategies on students’ academic progress. An experiment was conducted on third year students of architectural engineering during the course “introduction to project management” in one semester. The researcher designed two different types of group-based quizzes. The students were given one quiz before the midterm exam and the other one after the midterm exam. The students’ groups were a mixture of high and low achievers in order to make a balance between the groups on one hand, and to depict the mutual effect between them on the other hand. Students’ progress in previous semesters, in which only individual assessment strategies were applied, was analyzed as well in order to compare between the effect of both group-based and individual assessment strategies on students’ progress in general and low achievers progress in specific.

Motivation and Importance The significance of this research is motivated by the challenge of transforming teaching and learning process into an interactive process that enhances student’s active participation and involvement in the class. The researcher tried to apply some changes to the conventional assessment strategies in the course “introduction to project management” and to test the effect of such strategies on the students’ attitude and academic progress. It was easily noticed how the mood of the class has dramatically changed during the application of the new assessment strategies.

The importance of this study stems from the shift in the educational process from a teacher-centred approach to a student-centred approach. This shift is reflected on the concept of learning outcomes. In the past, learning outcomes of the academic programs and courses were limited to knowledge, understanding and subject specific skills. Nowadays, it is important to incorporate additional skills and competencies in the design of any course. General and transferable skills, such as practicing leadership and the ability to work effectively in a team are

examples of skills that should be developed and practiced in the design of any course. Applying group-based assessment is believed to reinforce such skills and competencies.

Academic progress of students in general and low achieving students in specific is another important issue related to this study. Many studies have focused on highlighting the problem of students with low GPA (low achievers) from different points of view (Mahenthiran and Rouse, 2000; Gaudet et al., 2010; Jabeen and Khan, 2013). Jabeen and Khan (2013) conducted a survey to compare between some attributes related to learning motivation in low and high achievers. They found that 'high achievers have high 'ego-ideal' (and) are self confident (and) competitive' while 'low achievers possess low ego-ideal, hardly bother to have a high position or status, (and) are not competitive' (p. 227). The experiment implemented in the current study demonstrates an attempt to merge low achieving students with high achieving ones in group-based assessment strategies, and to measure the effect on academic performance and progress of low-achievers.

Research Question

The paper attempts to discuss how group-based assessment can promote in-class active learning and academic progress of low achieving students in the course. An experiment is designed to test the effect of using two types of group-based quizzes (quiz bowl and sit group quiz) on the student's satisfaction and academic progress. In order to validate the experiment, the researcher analyzed students' academic progress in previous academic semesters in which only individual assessment strategies were applied.

Following are the two questions that the research tries to answer:

- Do group quizzes promote low achievers academic progress?
- Do group quizzes reduce the gap between low achievers and high achievers?
-

Research Objectives

The research aims at:

1. Highlighting the conceptual shift in higher education and its effect on collaborative and active learning.
2. Highlighting group-based quiz as an example of group-based assessment strategies.
3. Experimenting the effect of using group-based assessment on academic progress.
- 4.

Research Structure

The research is structured on six sections. The first section introduces the topic's context and background as well as the motivation behind conducting the research and its importance. The research question is also highlighted in this section. The second section underlines the shift in the educational concept from a teacher-centred approach to a student-centred approach, and its reflection on active and collaborative learning. The third section focuses on group-based assessment strategies, and their relationship with active and collaborative learning. The fourth section presents the experimental study of using group-based quizzes through highlighting experiment objectives, methodology, planning, implementation and results. The fifth section includes a discussion about the experiment results, limitations and implications. The sixth section contains the conclusion, recommendations and directions for further research.

Active And Collaborative Learning

This part of the study presents a theoretical background that covers some concepts related to the experimental study context with reflections on the conceptual shift of education from teacher-centred approach to student-centred approach. It underscores the definition, origin, features and benefits of two concepts related to education: active learning and collaborative learning.

Active Learning: A change in concept

Research indicates that the focus in the classroom should shift from the instructor to the student (Khalid and Nuhfer-Halten, 2012, p.1). Learning is an active endeavour that requires an effort and motivation from the learner in order to be able to understand, memorise, analyse, and synthesise what s/he received. Many studies have focused on active learning strategy (Meyers, 1993; Barr, 2011; Domenech et al., 2015; Khalid and Nuhfer-Halten, 2012; Hryciw and Dantas, 2016). Carefully designed assessments play a vital role in promoting active learning. Domenech et al. (2015) believe that 'it is of paramount importance to design assessment methods that properly motivate students to learn' (P. 154). In their study about active learning in polytechnic universities, Khalid and Nuhfer-Halten (2012) indicate that 'it is observed that tools like using props, making connections with past, and quiz bowl keep students interested and involved' (P. 1). Hryciw and Dantas (2016) found that 'scaffolded learning using active learning-lectures, small-group discussions and collaborative workshops, may enable students to develop their experimental design skills, but more importantly can be used to develop written scientific skills' (P. 1). Active learning is affected by the type of students' response to in-class assessment. Barr (2014) compared between using clickers and raising hand as a response method to questions answered during class. Statistical results

in her experiment demonstrate a significant difference both in participation and in comprehension with the different response methods (P. 317)

Active learning 'derives from two basic assumptions: (1) that learning is by nature an active endeavour and (2) that different people learn in different ways' (Meyers, 1993). Barr (2014) states that 'participation in the classroom has been shown to have a positive impact on cognitive, meta-cognitive, and affective learning' (P. 309). Group-based learning reinforces active learning because each student in the group will gain an experience from the learning styles of his/her peers. This experience helps in motivating students in a sense that each one will try to acquire a certain role in the process. Motivation of each individual in a group will not be the same by default. This is because interpersonal skills differ from one student to another.

Collaborative Learning: A Conceptual Shift

Collaborative Learning, sometimes called "cooperative learning", is a "mature concept with a solid research base accumulated over several decades". Cooperative learning is defined as 'students' collaboration to maximise their own and each other's learning, which is characterised primarily by group interdependence and individual accountability' (Dudley *et al.*, 1997; Johnson *et al.*, 1993 as cited in Mahenthiran and Rouse, 2000, p. 255). Studies have found out that in order for Cooperative learning strategies to lead to significant results, two components should be taken into consideration. The first component is promoting interdependence within groups, whereas the second component is holding students individually accountable for demonstrating their understanding of the material (Walters, 2000, p. 1). Yokomoto & Ware (n.d.) refer to two difficulties often reported by instructors when they use collaborative learning techniques in the class. The first difficulty is related to encouraging student acceptance of active learning, the second difficulty is to change the instructor's role from lecturer to facilitator. The instructor should design the scenario of collaborative learning in a way that demonstrates clearly the role of each student in the learning process. Moreover, assessment criteria associated with collaborative learning activities should combine assessing individual efforts, interpersonal skills and overall output of the group.

Walters (2000) believes that 'cooperative learning encourages social and interpersonal development as students learn how to work together and to appreciate diversity' (p. 3). Gaudet *et al.* (2010) state that Small Group Learning (SGL) can help in achieving effective teaching of science courses (p. 1). Through experimenting the effect of SGL, they found out that 'when students were given the opportunity to work on a quiz in pairs, the atmosphere in the classroom changed dramatically from solemn and serious to spirited and engaged' (p. 2). When asking students about the limitations of SGL, Gaudet *et al.* (2010) recorded minor issues related to coordinating schedules, managing time in class, disparate motivation and communication (p. 6). Kefale (2015) points to human and non-human constraints facing the implementation of cooperative learning. He refers to non-human factors such as class size, physical environment, shortage of instructional material and organisation of curriculum material (PP. 21-25). On the other hand, a meta-analysis, conducted by Springer *et al.* (1999), indicates that SGL improved academic achievement and reduced attrition in undergraduate science, math, engineering, and technology courses (as cited in Gaudet, *et al.*, 2010, p. 1). Discussion with peers can lead to the development of a new concept of understanding, so that students can answer conceptual questions better as individuals than they do prior to the group work (Smith (2009) as cited in Gaudet *et al.*, 2010, p. 8). A study conducted by Dohaney *et al.* (2012) tested the effect of collaborative learning on students learning gain. They found out that the learning gain of groups is systematically greater than the learning gain of individuals.

Group-Based Assessment: An Active Learning Strategy

Group-based quizzes are studied as an example of group-based assessment strategies, and then experimented in the next section of the study. In addition, this section highlights the concept of students' academic progress through the course, as one of the research objectives is to depict the effect of group-based assessment on students' academic progress in general and low-achieving students in specific.

Group-based Quizzes

Many experimental studies have been conducted to compare between collaborative group-based quizzes and individual quizzes. Giuliadori *et al.* (2009) examined the behaviour of both low performing and high performing students in group testing through physiology course. They tried to investigate whether students with individual correct answers change their answers when repeating the same experience in a group testing setting. Moreover, they tried to monitor the mutual effect between low and high performing (achieving) students. (p. 24)

Yokomoto & Ware (n.d.) highlight some benefits of the use of group-based quizzes in collaborative learning sitting. These benefits are, but not limited to, assisting in the development of course's instructional materials that can positively reflect on the learning process, training students to develop their learning skills, promoting active learning and interaction among students, and reducing students' anxiety with quizzes. Yokomoto & Ware (n.d.) advise instructors to include instructions that improve student's critical thinking and problem solving skills when designing a group-based quiz.

Yokomoto & Ware (n.d.) experience three variations related to the discussion time offered for students in case of group quizzes. The first variation is to allow students' discussion on certain principles related to the quiz topic before reading the quiz; the second variation is to allow students' discussion within 2 to 3 minutes after reading the quiz; the third variation is to allow students' discussion on certain principles related to the quiz topic before sitting for individual quizzes. Yokomoto & Ware (n.d.) conclude features of successful group quiz design. They clarify that it is important not to allow students to write anything during the discussion period in order to leave a space for students' brain storming process; it is advised that only one student from the group to write the solution whereas other members actively participate in the group; it is advised to adopt harder grading scheme that assures fairness in judging students' achievement and to prevent the group from just leaving the work to the best student; it is important to focus on basic principles of the subject rather than memorization; and finally students should be given any information that would be difficult to recall under the stress accompanying quizzes.

In their experiment on group-based quizzes, Gaudet *et al.* (2010) found out that course and quiz design seemed to encourage group discussion and debate about potential answers before writing down a single answer for the group. However, they recorded minor disadvantages as 'some students reported anxiety associated with the quizzes. Some students could not participate confidently in group discussions because they did not have time to read the quiz questions before a group member jumped in with an answer' (p. 2). These results imply that the instructor should prepare some instructions that regulate the quiz implementation in an organised way. In addition, he should present necessary basic information that may help students in their response to the quiz.

Quiz bowl is an example of group-based quizzes. Khalid and Nuhfer-Halten (2012) explain that quiz bowl is an 'enjoyable, educational technique that uses a game format derived from the TV show *College Bowl*, the quiz bowl questions are based entirely on one subject, typically the subject covered in the previous lecture'. They add that one of the distinctive features of quiz bowl method is that the instructor's role shifts to a facilitator. He "helps them relax, laugh at their own mistakes, and get caught up in the contagious spirit of the game" (p. 5)

Effect on Students' Academic Progress

Some studies have been conducted to measure the effect of group-based quizzes on students' academic progress through the course, which can be measured through student's marks in sit exams. Yokomoto & Ware (n.d.) found that both group quizzes and individual quizzes demonstrate correlation coefficients with semester exam averages that are significantly different from zero.

Mahenthiran and Rouse (2000) revealed that students can be grouped in a variety of ways such as by gender, grade point average (GPA), or majors. They noted that random grouping of students can lead to positive results if the group has a good attitude towards work. On the other hand, it may lead to negative results if the group has low ability (p. 257). They believe that teachers should intervene to balance the groups in a way that each group consists of high and low ability students (p. 259). The experiment conducted in the current study follows this model of mixed students' groups.

When Gaudet *et al.* (2010) tested the effect of experiment about group-based quizzes on high achieving students; they found that they benefited from the 'explanations provided by their peers in Small-group setting' (p. 6). On the other hand, it was found that low-achieving students developed 'a better conceptual understanding of material over the term' (p. 8). These findings imply that all students got benefited from the group-based quiz setting. The current study tries to depict that effect.

Experimental Study

This section of the study covers the experimental study that was conducted by the researcher in his class. The section starts with the experimental study objectives and methodology, and then moves to the planning and implementation of the experiment. Finally, the section concludes with results and implications of the experimental study.

Experimental Study Objectives

The experimental study aims at:

- i. Applying group-based quizzes as example of group-based assessment strategies used to test students' attainment of Course's Intended Learning Outcomes (CILOs).
- ii. Investigating the effect of applied group-based quizzes on low achievers' academic progress in the course throughout the semester.
- iii. Comparing between low achievers' progress throughout the semesters in which individual quizzes are applied and their progress throughout the semesters in which group-based quizzes were applied.
- iv. Measuring the gap between low achievers and high achievers throughout the semesters in both cases of applying individual quizzes and group-based quizzes,

Experimental Study Background and Methodology

The researcher has taught the course “Introduction to Project Management” over 11 semesters. The instructor used individual quizzes strategy in the first 9 semesters (79 students). However, he changed his strategy in the 10th and 11th semester (30 students) to group-based quizzes. The instructor used two types of group-based quizzes. The first type was the “quiz bowl” which was applied at the beginning of the second quarter in the semester before midterm exams. The second type was the “sit-group quiz” and it was applied at the beginning of the third quarter of the semester between midterm and final exams.

The experimental study methodology is based on four interlinked stages. The *first* stage is the planning stage, in which the group-based quizzes and their evaluation criteria were designed and the students groups were identified. The *second* stage is the implementation stage, in which students’ groups sat for the quizzes and their performance was graded over two semesters. The *third* stage is the analysis stage, in which students’ achievement in both group-based quizzes and individual-based assessment strategies were analyzed in order to come up with some findings. The *fourth* stage is the comparative analysis stage, in which students’ performance and progress rate in the two semesters where group-based quizzes were applied is compared to the results of the previous nine semesters in which no group quizzes were applied at all (only individual-based quizzes) in order to trace the effect on low achievers. The following section explains in detail the stages of the experimental study.

Experimental Study Planning

The experimental study was applied in the course “Introduction to Project Management” during 11 semesters (total of 109 students). Students were classified according to their academic abilities (achievement) into two categories: Low Achievers (LA) (Those students with Cumulative Grade Point Average (CGPA) less than 2.7 out of 4) and high achievers (HA) (Those students with CGPA between 3 and 4 out of 4). Students with CGPA between 2.7 and 3 (medium achievers) were excluded from the experiment.

The instructor decided to use group-based quizzes in the 10th and 11th semesters (30 students). The class in both semesters was divided into groups of 3 or 4 students. The distribution of students among groups was based on their CGPA in a way that assures the balance between averages of students’ CGPA in each group. Another important factor was to combine low achievers with high achievers in each group.

The instructor decided to apply two different types of group-based quizzes during the semester. The first type (quiz bowl) was conducted after passing the first quarter of the semester (before the midterm exam), whereas the second type (sit group quiz) was conducted after passing the third quarter of the semester (between the midterm and final exams).

Applying Quiz Bowl Method

The instructor prepared the first group-based quiz (quiz bowl) with some rules to facilitate the smooth running of the experiment. The quiz bowl was based on twenty questions. Questions were structured on finding the suitable technical term or expression that was missing in an argument. A desktop bell (buzzer) was given to each group. The maximum allowed time for answering each question was 30 seconds. After listening to each question from the instructor, the timer started and each group had to try to answer before the other groups. Accordingly, the group which knew the answer had to activate the buzzer “ring the bell” (in this case, the other groups had to stay silent). If the first group’s answer was correct, a mark was recorded, and the next question had to start. However, if the group’s answer was wrong, a 15 seconds chance was given to the other groups to guess the correct answer. If any of the other groups’ answer was correct, a mark was recorded, and the next question had to start. If the other group’s answer was wrong, the instructor stated the correct answer and moved to the next questions. In this case, no mark was recorded for any group. In all cases, only one answer trial was allowed for each group. Figure (1) shows the quiz bowl flow chart.

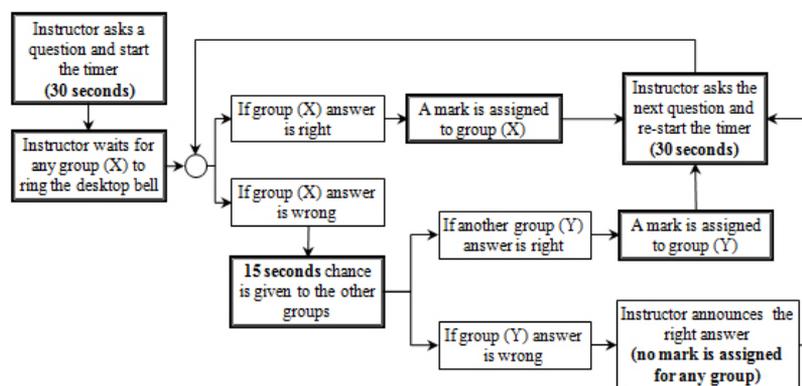


Fig. 1 Quiz bowl flow chart

Because of the time factor, which characterises quiz bowl method and differentiates it from individual sit quiz, a non-linear marking scheme was designed by the instructor. Table (1) demonstrates the difference between marking scheme of individual sit quiz and quiz bowl.

Table (1): Comparison between marking scheme of individual sit quiz and quiz bowl

Number of correct answers (out of 20)	Marking Scheme (out of 10)	
	Individual sit quiz	Quiz bowl
Zero	Zero	Zero
1 to 3	0.5 to 1.5	2.5
4 to 6	2.0 to 3.0	5.0
7 to 9	3.5 to 4.5	7.0
10 to 12	5.0 to 6.0	8.5
13 to 15	6.5 to 7.5	9.5
16 to 20	8.0 to 10.5	10

Applying Sit Group Quiz Method

The instructor prepared another type of group-based quizzes during the second half of the semester and after the midterm exam. The quiz was “group sit quiz”; it covered a further part of the course. The quiz consisted of 10 questions that should be answered in 5 minutes (30 seconds per question). The questions were printed and submitted for each group. The groups sit apart, each group’s members started to collaborate in answering the questions. The quiz was collected and marked (10 % of the mark is given for each correct answer). Figure (2) shows the sit group quiz flow chart

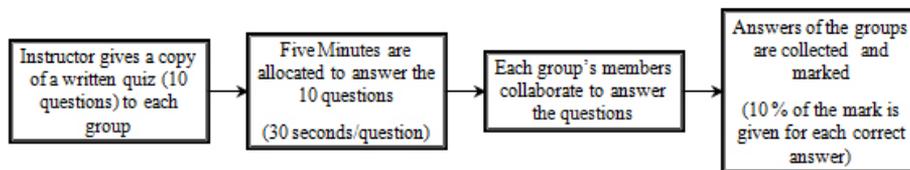


Fig. 2 Sit Group Quiz Flow Chart

Results of group-based quizzes semesters

The primary target of analyzing results of applying the previously mentioned group-based quizzes was to measure their effect on students’ performance and academic progress throughout the semester. The gap between low-achievers and high achievers was also investigated. The results of both group based quizzes and the two major exams (midterm exam and final exam) were analyzed in order to measure student’s academic progress in the course. Table (2) shows average of low achievers marks, high achievers marks and entire students’ marks in the four assessments. The table also illustrates the average of students’ marks in individual assessments (midterm and final exams) and the average of student’s marks in group-based assessments (quiz bowl and sit-group quiz). The academic progress curves and comparisons bar charts are generated from this table.

Table (2): Average of students’ marks in group-based quizzes and individual major exams

	Student’s Marks (%)				Average of Individual Assessments Marks	Average of Group-Based Assessments Marks
	Quiz Bowl	Midterm exam	Sit-group Quiz	Final Exam		
Average marks of students (2 semesters-30 students)	72.33	86.97	76.50	76.30	81.63	74.42
Average marks of Low achievers (12 students)	69.58	81.63	74.17	70.90	76.26	71.88
Average marks of high achievers (18 students)	74.17	90.53	78.06	79.90	85.22	76.11
Average of students’ progress (%)	72.33	79.65	78.60	78.03		
Average of low achievers progress (%)	69.58	75.61	75.13	74.07		
Average of high achievers progress (%)	74.17	82.35	80.92	80.67		

Figure (3) shows average marks of both low achievers and high achievers in the four assessment strategies. It also demonstrates the average performance of all students. The figure shows that:

- The class average lies between the low achievers average and the high achievers average in all the assessment strategies.

- The average performance of both low and high achievers in the sit group quiz is higher than their average performance in quiz bowl.
- The average performance of low achievers in the final exam (individual assessment) is lower than their average performance in the sit group quiz (group-based assessment).

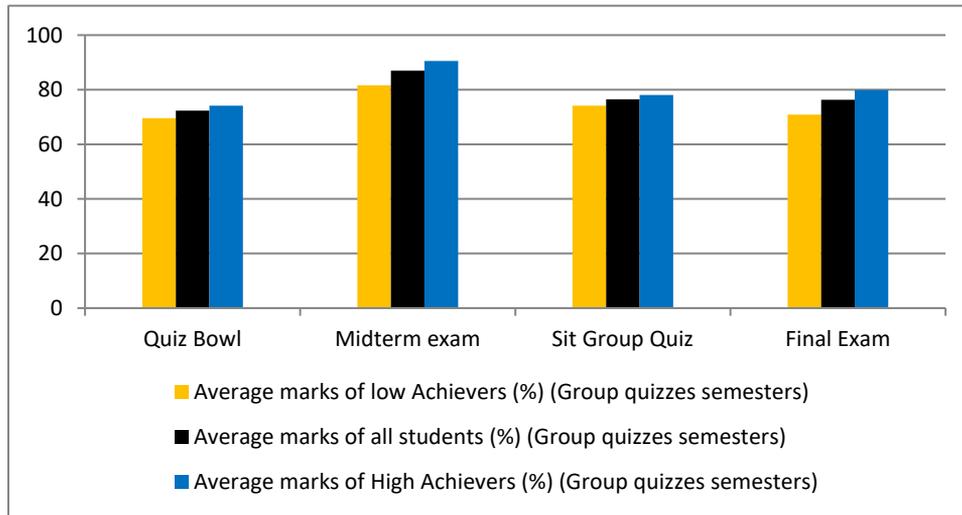


Fig. 3 Average low achievers, high achievers and entire students marks (group-based quizzes semesters)

Figure (4) shows the average progress curves of low and high achievers, in addition to the entire classes in the four assessment strategies. The curves reveal that:

- The trend of academic progress for low and high achievers is similar, reflecting maximum progress after passing the midterm
- Both low and high achievers recorded the minimum marks in the first assessment. However, they progressed throughout the semester.
- The gap between low and high achievers was 4.58 in the quiz bowl. It increased in the midterm exam (6.74%), then decreased to (5.79%) in the sit group quiz. Finally, it slightly increased to (6.6%) at the end of the semester. See figure (5)

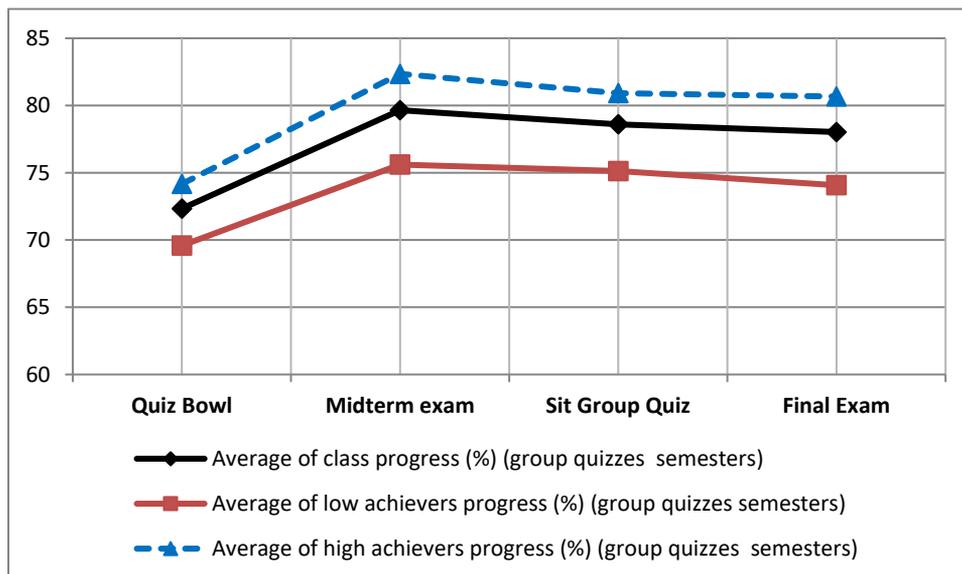


Fig. 4 Students' progress curves classified by students' levels (in group quizzes semesters)

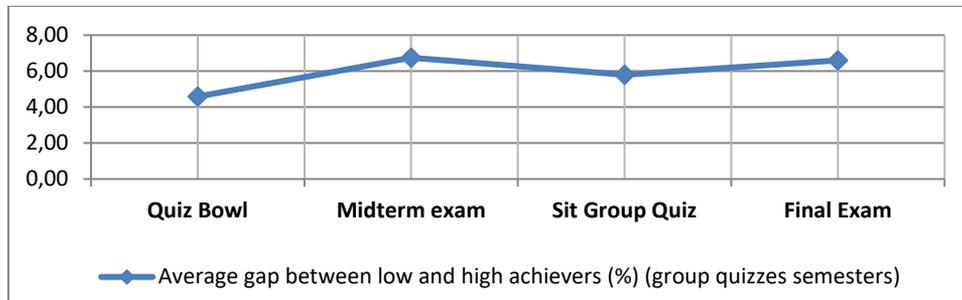


Fig. 5 Average gap between low and high achievers (in group quizzes semesters)

Results of Individual quizzes semesters

As mentioned before, the instructor used individual quizzes strategy in nine semesters. The number of students over the 9 semester after excluding the medium achievers (students with CGPA between 2.7 and 3) was 79 (29 low achievers and 50 high achievers). The average marks of low and high achievers as well as the entire students’ over the nine semesters were calculated. Table (3) shows the numerical data.

Table (3): Average of students’ marks in individual quizzes semesters

	Student’s Marks (%)				Average of Individual Assessments Marks
	Quiz 1	Midterm exam	Quiz 2	Final exam	
Average marks of all students (Individual quizzes semesters)	77.78	79.51	79.30	73.73	77.58
Low Achievers average (Individual quizzes semesters)	56.90	63.48	56.90	75.06	78.21
High Achievers average (Individual quizzes semesters)	89.90	88.80	92.30	78.43	87.36
Average of students’ progress (%) (Individual quizzes semesters)	77.78	78.65	78.86	77.58	
Average of low achievers progress (%) (Individual quizzes semesters)	56.90	60.19	59.09	63.08	
Average of high achievers progress (%) (Individual quizzes semesters)	89.90	89.35	90.33	87.36	

Figure (6) shows average marks of both low and high achievers in the four assessment strategies. It also demonstrates the average performance of all students. The figure shows that:

- The class average lies between the low achievers average and the high achievers average in all the assessment strategies except the final exam.
- The average marks of low achievers in the midterm and final exams were higher than their average marks in the two quizzes. They recorded a higher average in the final exam. However, the average marks of high achievers in the midterm and final exams were lower than their average marks in the two quizzes. They recorded a lower average in the final exam.

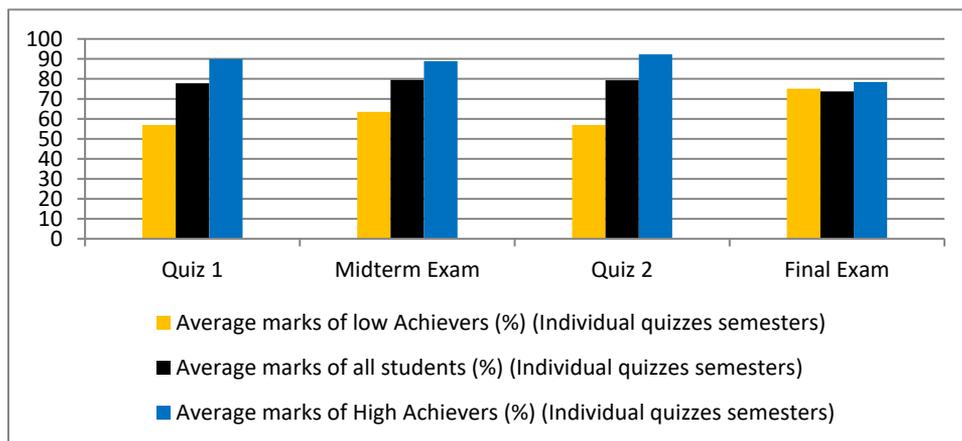


Fig. 6 Average marks of low achievers, high achievers and entire students (individual quizzes semesters)

Figure (7) shows the average progress curves of low and high achievers, in addition to the entire classes in the four assessment strategies. The curves reveal that:

- The trend of academic progress for low achievers showed a positive progress towards the end of the semester. However, high achievers progress declined slightly towards the end of the semester.
- The gap between low achievers and high achievers was the highest at the beginning of the semester according to marks recorded in the first individual quiz. The gap decreased after midterm exam,

then increased again after sitting for the second individual quiz. Finally, the gap decreased significantly after marking the final exam. See figure (8)

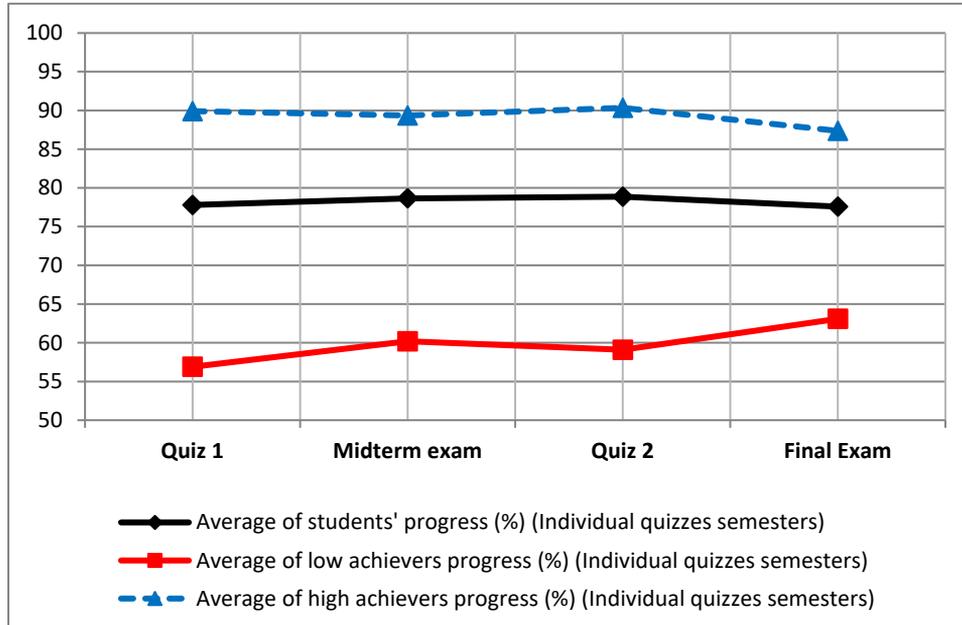


Fig. 7 Students' progress curves classified by students' levels (in individual quizzes semesters)

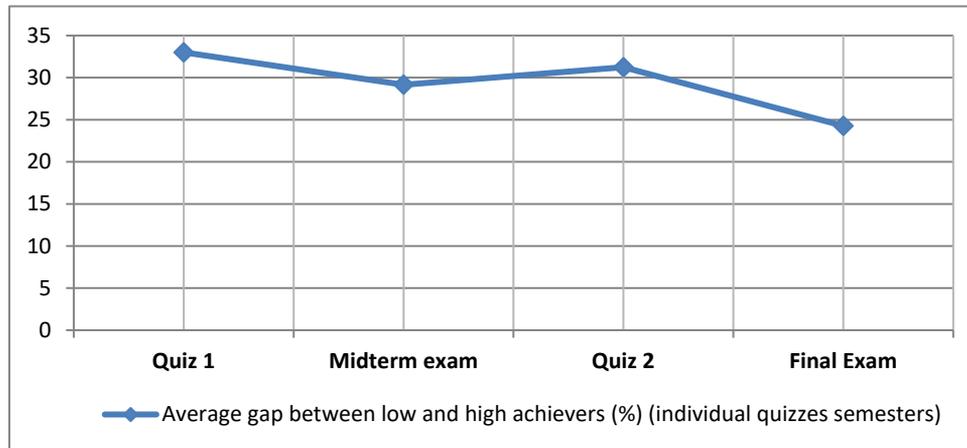


Fig. 8 Average gap between low and high achievers (in individual quizzes semesters)

Group-based quizzes semesters vs. individual quizzes semesters

This section of the experimental study aims at comparing between low achievers performance and the academic progress in both cases of applying individual quizzes and group-based quizzes based on the previously highlighted data. The gap between low and high achievers in both cases is also studied. Figures (9) and (10) combine these comparison factors.

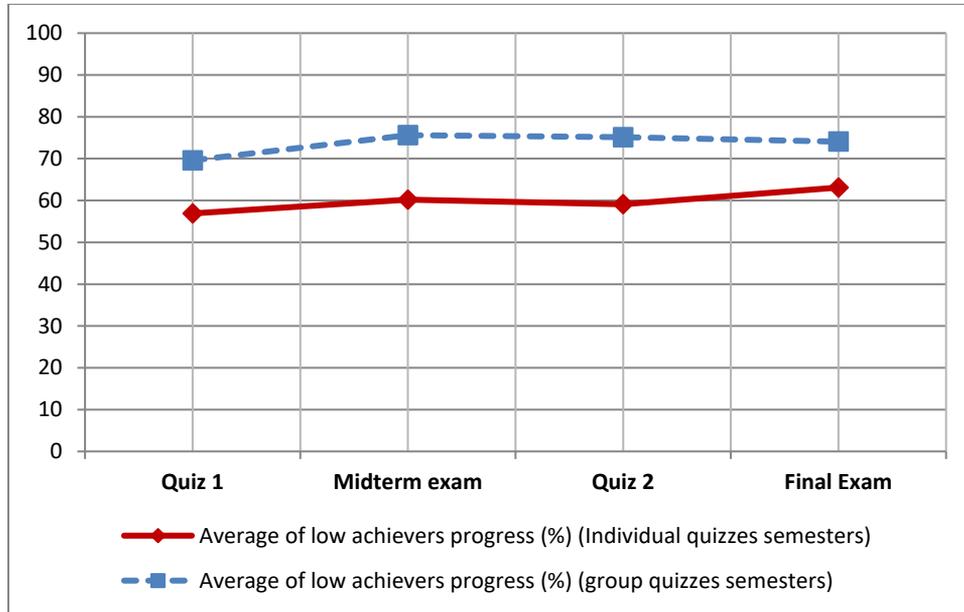


Fig. 9 Average progress of low achievers (individual quizzes semesters and group-based quizzes semesters)

Figure (9) clearly shows that, low achievers' marks during semesters in which group-based quizzes were applied were higher than low achievers marks during semesters in which individual quizzes were applied. This is noticed in all assessment milestones (1st quiz-midterm exam-2nd quiz-final exam). Figure (10) shows that the gap between low and high achievers' marks decreased significantly in all four assessment milestones after applying group-based quizzes in the course assessment strategies.

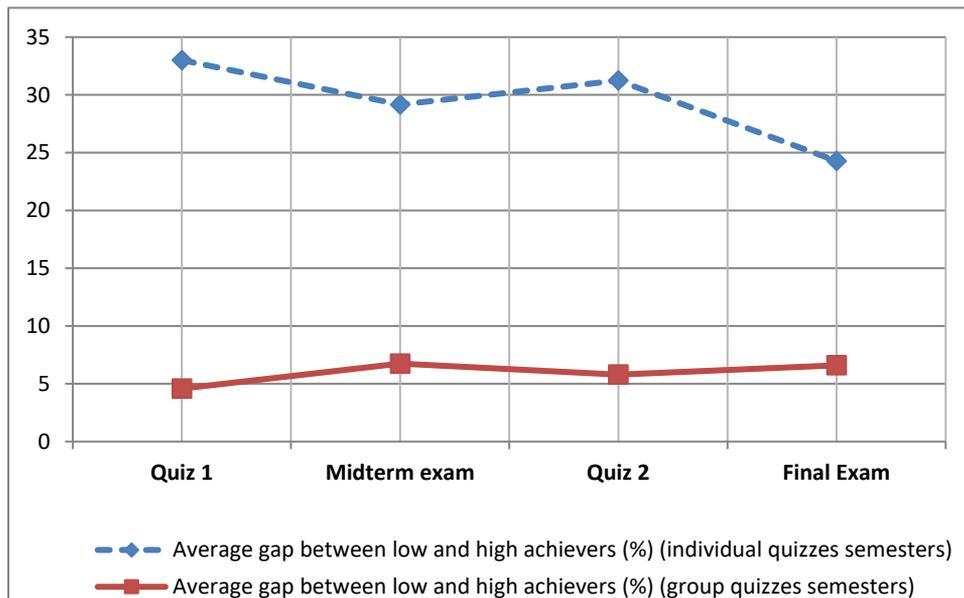


Fig. 10 Average gap between low and high achievers (individual quizzes semesters and group-based quizzes semesters)

In order to answer the research questions, inferential statistics methods were implemented to compare between low achievers' performance in both cases of applying individual quizzes and group-based quizzes. Accordingly, the null hypothesis (H_0) and alternative hypothesis (H_1) are as follows:

- H_0 : There is no significant difference between average marks of low achievers in individual quizzes semesters and group-based quizzes semesters
 - H_1 : Average of low achievers marks increase significantly when applying group-based quizzes
- In order to test the previous hypotheses, we need to compare between the average marks of two populations:
- Population I: Low achievers in group-based quizzes semesters
 - Population II: Low achievers in individual quizzes semesters

Table (4) shows the samples statistics related to the two populations

Table (4): Samples statistics

	Population I	Population II
Sample size (n)	$n_1= 12$	$n_2=29$
Average mark of low achievers (\bar{X})	$\bar{X}_1 = 73.89$	$\bar{X}_2 = 60.73$
Standard deviation (s)	$S_1 = 6.49$	$S_2 = 17.73$
Variance (s^2)	$S_1^2 = 42.1201$	$S_2^2 = 314.3529$

As the populations with unknown variance, t test will be used according to the following equations:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{Sp^2}{n_1} + \frac{Sp^2}{n_2}}}$$

Where

$$Sp^2 = \frac{(n_1 - 1)s_1^2 + (n_2 - 1)s_2^2}{n_1 + n_2 - 2}$$

By using the values in table 4 and applying equations 1 and 2, the value of t is 2.49. The critical value of t (giving that the alternative hypothesis is positive directional one (one tailed test), degree of freedom = $n_1 + n_2 - 2 = 39$ and significance level $\alpha = 0.05$) is 1.684. Accordingly, calculated t lies in the rejection zone of H_0 . This reveals that there is a significant increase with significance level $\alpha = 0.05$ in low achievers average mark when applying group-based quizzes in the course.

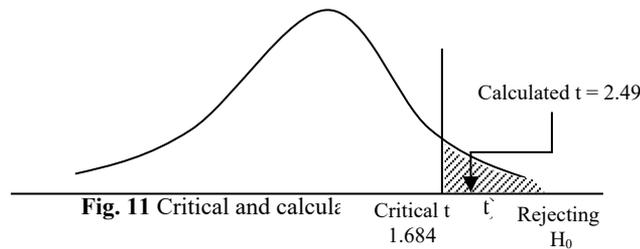


Fig. 11 Critical and calculate Critical t 1.684 t_c Rejecting H_0

Discussion And Limitations

This section of the study attempts to discuss the results and limitations of the experimental study with reflections on the theoretical background and the research question. Finally, the study ends with a conclusion, recommendations and directions for further research.

Discussion

- Yokomoto & Ware (n.d.) refer to a concern that the instructor may think of when incorporating collaborative learning, which is how can grades be assigned meaningfully if some students receive higher grades on group-based assignments than they would earn individually. This case frequently occurred in the current experiment. Many studies have recommended mixing both individual assessment and group-based assessment strategies in course management. This mixture helps in testing each student's individual performance, in addition to his interpersonal skills. From another point of view, Yokomoto & Ware (n.d.) defend the use of group quizzes as assessment strategies. They explain that incorporating group quiz scores in individual's course grade is unlike using homework scores. In their experiment, Gaudet et al. (2010) found out that group quiz mark was higher than the individual quiz mark of highest achievers in each group (p. 1). This reveals that mixing low-achievers with high-achievers has a positive impact on both groups. The current study supports this result.
- It is preferred to mix group-based and individual assessments and try to monitor and compare between students' performance in both types. The current study partially points to this comparison through including both midterm and final exams' marks. Individual homework assignments (20% of the course's total mark) were not included in the experiment as they were not fully monitored by the instructor. Yokomoto & Ware (n.d.) note that students often seek assistance on their homework, and hence it is difficult to determine how far a student's paper represents his/her individual work.
- The theoretical and practical parts of the study pinpoint the importance of bridging the gap between low and high achievers. Yokomoto & Ware (n.d.) uses the term 'academic vacuum' to describe this gap. One

of the academic advising challenges is to monitor the academic progress of at-risk students through finding possible ways that help low achieving students to raise their GPAs so that the gap between them and high achievers can be reduced.

- The type of questions offered in both group-based quizzes allowed the instructor to give an instant mark for both groups direct after finishing the quizzes. For students, this raised the degree of excitement. In the quiz bowl, students could easily calculate their marks after each question based on the detailed criteria that was given to them. Students appreciated receiving feedback from the instructor on the spot, especially in case of quiz bowl method. Carless (2015) asserts the importance of “same-day feedback”. Through an experiment on learning-oriented assessment, he found that “the same-day discussion and debate also brings elements of dialogue into the feedback process” and “feedback aims to clarify issues immediately and feed-forward to future related tasks” (p. 973).

• **Limitations**

- In the group-based quizzes semesters, students were classified according to their CGPA in the previous semester into two groups: low achievers and high achievers. Medium achievers were neglected. Some previous studies have included medium achievers as well. Dohaney et al, (2012) conducted a study to test the effect of collaborative learning on students learning gain. They mixed between low, medium and high achievers in the same group.
- The experimental study was limited to in-class assessment strategies (quizzes, midterm exam and final exam). These assessment strategies formed 80 % of the total course mark. Assignments and homework (20%) were, intentionally, not included in the experiment for the reason stressed by Yokomoto & Ware (n.d.) as mentioned in the discussion section.
- The experimental study was applied to one course (introduction to project management) over several semesters. Applying the experiment in different types of courses is highly recommended.

• **Conclusion And Recommendations**

Conclusion

The researcher demonstrated the transformation of higher education concepts. He pinpointed the idea of active and collaborative learning through group-based assessment strategies as one of the features of that transformation. The applied part of the study aimed at comparing between the effect of collaborative learning through group-based quizzes and the effect of traditional individual quizzes on the academic performance and progress of low achieving students. Two examples of group-based quizzes were applied during two semesters in the course of “introduction to project management”. The academic performance of low and high achievers, in addition to the entire class was measured during these semesters and compared to the academic performance in previous individual quizzes-based semesters. It was found that academic performance of low- achievers in quizzes as well as midterm and final exams was considerably higher during semesters through which group-based quizzes were applied. Moreover, using group-based quizzes significantly helped in reducing the gap between low and high achievers’ academic performance.

Recommendations and directions for further research

- It is preferred to combine group-based and individual assessments and to monitor and compare between students’ performance in both types. This study partially outlined this comparison.
- It is very important that the instructor monitors the behaviour and contribution of each student within a group. One of the possible drawbacks of cooperative learning is the potential unbalanced role of students within the group. Walter (2000) states that ‘cooperative learning is most likely to go wrong when one of the students does all the work while others watch’ (p. 1).
- Generally, it is highly advised that the instructor utilises various types of group-based quizzes that put groups in an exciting and active learning situation.
- It is important to strengthen the effectiveness of academic advising in monitoring the academic progress of at-risk students through finding possible ways that help them to raise their GPA so that the gap between low and high achievers can be reduced.
- Further study is required to observe and analyze the behaviour and motivation of low-achievers during implementation of active and collaborative learning. Different ways of grouping students can be experimented. For example, a comparative analysis study can be applied on various students’ group settings (grouping low-achievers together vs. combining low and high achievers).
- Further study is needed to examine the effect of other methods of group-based quizzes on students’ academic performance during the semester.

References

- Barr, M. L. (2014). Encouraging college student active engagement in learning: The influence of response methods, *Innovative higher education*, Springer, Vol. 39, Issue 4, PP. 307-319
- Carless, D. (2015) Exploring learning-oriented assessment processes, *Journal of higher education*, Springer, Vol. 69, issue 6, PP. 963-976
- Dohaney, J., Brogat, E. and Kennedy, B. (2012). Successful curriculum development and evaluation of group work in an introductory mineralogy laboratory, *Journal of geosciences education*, Vol. 60, No. 1, pp. 21-33
- Domenech, J., Blazquez, D., De la Poza, E., Munoz-Miquel, A. (2015). Exploring the impact of cumulative testing on academic performance of undergraduate students in Spain, *Journal of educational assessment, evaluation and accountability*, Springer, Vol. 27, Issue 2, PP. 153-169
- Gaudet, A.D., Ramer, L.M., Nakonechny, J., Cragg, J.J. and Ramer, M.S. (2010). Small-Group Learning in an Upper-Level University Biology Class Enhances Academic Performance and Student Attitudes Toward Group Work. *PLoS*, Vol. 5, Issue 12, e15821, Doi:10.1371/journal.pone.0015821
- Giuliodori, M., Lujan, H. and Dicarolo, S. (2009). Student interaction characteristics during collaborative group testing, *Advances in physiology education*, Vol. 33, No. 1, pp. 24-29
- Hryciw, D. and Dantas, A. (2016). Scaffolded research-based learning for the development of scientific communication in undergraduate physiology students. *International journal of innovation in science and mathematics education*. Vol. 24, No. 1
- Jabeen, S. and Khan, M. (2013). A study on need achievement of high and low achievers, *Journal of education and practice*, Vol. 4, No. 4, ISSN 2222-1753
- Johnson, D.W., Johnson, R.T. and Smith, K.A. (1998). *Active Learning: Cooperation in the College Classroom*. Edina, MN: Interactive Book Company
- Kefale, Y. (2015). Problems affecting the implementation of cooperative learning: primary schools in focus, Master thesis, Addis Ababa University, PP. 21-25
- Khalid, A. & Nuhfer-Halten, B. (2012). Enhancing Learning at the Polytechnic University: Interactive Classroom Techniques, *International Journal of Polytechnic Studies*, Vol. 1, No. 2
- Mahenthiran, S. and Rouse, P. (2000). The impact of group selection on student performance and satisfaction, *International Journal of Educational Management*, Vol. 14, No. 6, MCB University Press, pp. 255-264
- Meyers, C. & Jones, T. B. (1993). *Promoting Active learning: Strategies for the College Classroom*. San Francisco, CA: Jossey-Bass
- Simms, M. and George, B. Approaching assessment from a learning perspective: elevating assessment beyond technique, *Journal of educational assessment, evaluation and accountability*, Springer, Vol. 26, Issue 1, PP. 95-104
- Smith, M.K.; Wood, W.B.; Adams, W.K.; Wieman, C.; Knight, J.K.; et al. (2009). Why peer discussion improves student performance on in-class concept questions. *Science*, Vol. 323, pp. 122-124
- Springer, L., Donovan, D.S., Stanne, M.E. (1999). Effects of Small Group Learning on Undergraduates in Science, Mathematics, Engineering and Technology: A Meta-Analysis. *Review of Educational Research*, Vol. 69, pp. 21-51
- Walters, L. S. (2000) Putting Cooperative Learning to the Test, *Harvard Education Letter*, Vol. 16, No. 3
- Yokomoto, C.F. & Ware, R. (n.d.). Variations of the Group Quiz that Promote Collaborative Learning. *Indiana University-Purdue University*. Indianapolis, Retrieved on June, 2014 from: <https://wiki.queensu.ca/download/.../groupquiz.pdf>

Promoting Best Practices Of Computer Based National Exam (Unbk) Achievement In Indonesia

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Abstract

The crucial issues of the Computer Based National Exam (UNBK) implementation in Indonesia related to distribution of achievements and resources. Responding to those issues, it requires study with aimed at generating hypothesis of best practices of UNBK achievement which contribute to formulate policy on national assessment program. Case studies of senior high schools in some provinces and local policies of the Yogyakarta Office of Education are selected for comparative analysis that can be a useful way to generate hypothesis. The study shows that in teaching and learning processes, the schools not only focus on UNBK achievement, but they also focus on broader achievement to enhance education quality. Further, the study generates hypothesis that in order to improve UNBK achievement and education quality require multi-approaches which supported by public participation and sociocultural strength.

Keywords: *Computer Based National Exam (UNBK), multi-approaches, public participation, sociocultural strength.*

Introduction

As an optional program of Indonesia National Exam (UN), Computer Based National Exam (UNBK) receives positive trending response from secondary schools in term of participation (63,20% in 2017), feed back, preparation quality, process, and result (Prakoso, 2017a). In short, UNBK program that really depends on educational technology is able to overcome the issue of assessment program objectively.

The positive trend can be observed from the participation of UNBK participants. For example in senior high school (SMA) level, in 2015 there were 134 science programs (IPA) and 129 social programs (IPS) that have implemented UNBK. In 2016 has increased to be 1209 for IPA programs and 1192 for IPS programs. The rapid increase has occurred in 2017, there were 6857 IPA programs and 8176 IPS programs.

In the context of achievement score, data by province shows a varied progress. As representative illustrations are presented five provinces that have the highest average score of UNBK for SMA IPA and IPS study program. In the following data, it appears that the five provinces in 2017 had an average score above the national average score of 66.23 for the IPA program and 63.58 for the IPS program. Selected data in 2016 and 2017 were considered to be consistently comparable (shown in **Table 1**).

Table 1. Provinces with highest average of UNBK for IPA & IPS programs

No	Prog	Provinces				
		Bali	Kalbar	DIY	Jateng	Jakarta
2017	IPA	71,95	71,53	67,62	66,43	66,21
2016	IPA	69,44	65,28	60,70	62,87	63,66
2017	IPS	67,71	68,97	68,96	65,46	66,67
2016	IPS	62,39	59,21	63,74	62,39	60,74
UNBK in %		39%	20%	99%	64%	99%

Source: Puspendik 2016 & 2017

More specifically, Roebianto et. al. (2017) stated that in IPA program, the average scores of Bahasa Indonesia, English, Physics, and Chemistry subjects have increased. Mathematics and Biology subjects actually decreased the average scores. While in IPS program has increased average score for all subjects, except Geography.

In the context of city participant, Roebianto et. al. (2017) stated that Surabaya city has the highest number of schools implementing UNBK from 2015 to 2017 in the province of East Java. Another note that the average score of UNBK in 2017 is still below the national and provincial UNBK averages. Nevertheless, Surabaya city has the highest Integrity Index of National Exam (IIUN).

Those data provide clue and crucial problems of the UNBK implementation. Firstly, most provinces have an average score below the national average score (academic achievements) for IPA and IPS programs. Secondly, there are still 36.80% of SMA/MA in Indonesia (<http://un.kemdikbud.go.id>) were not able to implement UNBK either as implementing schools or participating in other schools (facilities and challenges).

Observing those conditions, in order to improve education quality in Indonesia, it is necessary to formulate educational policies related to academic achievements and school facilities. One of the first ways that can be conducted is to provide best practices contributing inspirations and benefits both to policy makers and stakeholders.

One of the strategies to improve education quality is formulating best practice. According to Merriam-Webster, best practice is a procedure that has been shown by research and experience to produce optimal results and that is established or proposed as a standard suitable for widespread adoption. As a transformative function, Boissiere (2004) affirmed that quality has been at the core of the motivating forces for reforms in education. Furthermore, the United Nations Educational, Scientific, and Cultural Organization (UNESCO) stated that “good practice is a key element of the network’s strategy to contribute to promoting quality education ...” (<http://www.unesco.org/new/en/education/networks/global-networks/aspnet/good-practices/>).

To produce policy research that has a multi perspective approach, this study tries to enhance sharpness the draft study of Roebianto which only used quantitative data and single perspective. However, to improve the education quality through assessment program, it requires a multi perspective that matches to complex challenges. In the midst of data limitations, access difficulties, and time constraint, the purpose of this study is to generate hypothesis of best practices for UNBK implementation.

Research Method

To answer complex problem statements with limited data, and difficulty in access, the case study is selected as a research method. Yin (1984) stated that comparative analysis of cases can be a useful way to generate hypothesis about phenomena that combine complex phenomena, long-term dynamics, and difficulty in access.

Qualitative and quantitative of primary and secondary data are used at this study (Eisenhardt and Bourgeois, 1988). Spiral analysis is taken by generating raw data, organizing data, reading and making notes, identifying themes, amalgamating themes, interpreting data, and back to reading and making notes (Creswell, 2009).

Mixed data of some areas and schools are used in data collection. In order to be consistent in comparison each year, data of schools were also utilized in succession following UNBK. To complement quantitative data, interviews with school principals have been conducted in 4 cities (Malang, Palangkaraya, Surabaya, and Yogyakarta). Based on secondary data, five schools have been visited to obtain qualitative data are referral schools that have high average score for UNBK.

Case Studies

Here are the mean score and standard deviation data that commonly asked by schools and public related to the UNBK achievement. To complement quantitative data, this study provides strategic points that are relevant to the research aim.

Case Study 1: SMAN 5 Surabaya

Table 2. Mean Score for SMAN 5 Surabaya

		IPA Program			IPS Program		
		2017	2016	2015	2017	2016	2015
1	Mean	81.97	79.68	82.31	77.83	75.70	79.78
	Std. Deviation	(27.17)	(39.44)	(35.14)	(39.69)	(48.19)	(22.50)

Strategies to improve the UNBK score and implementation:

1. Cultivating the understanding that the UN score will affect the academic achievement of the students in universities

2. Providing reward to the team of subject teachers through academic achievement competition of among subjects
 3. Providing school contract for academic achievement that "SMAN 5 Surabaya will achieves the top 10 ranking in East Java."
 4. Inviting the Tuition Center (bimbel) for the deepening of the UN materials
- Source: Rahmah Zulaiha, November 2017

Case Study 2: SMAN 6 Surabaya

Table 3. Mean Score for SMAN 6 Surabaya

		IPA Program			IPS Program		
		2017	2016	2015	2017	2016	2015
1	Mean	74.74	72.17	71.28	72.36	65.75	61.92
	Std. Deviation	(29.58)	(46.49)	(46.17)	(40.19)	(46.22)	(32.78)

Strategies to improve the UNBK score and implementation:

1. Implementing Focus on Learning. The placement of students in the classroom based on permanent administrative criteria and flexible academic achievement. Administrative criteria is attended on Monday, while on academic achievement criteria is attended from Tuesday to Friday. The students of certain parallel class 12 may move to another parallel class according to the UTS score of the UN's subjects that have been ranked.
 2. Providing motivation of learning and achievement by parents of students conducting every Monday of the third week
 3. Optimizing the role of School Committees to assist the process and output of learning
 4. Cooperating with Tuition Center (bimbel) for deepening of the material and giving insight on the universities
 5. Visiting to some universities to add insight and motivation
 6. Visiting the Indonesia Naval Academy (AAL) aimed at instilling discipline to students
- Source: Rahmah Zulaiha, November 2017

Case Study 3: SMAN 1 Malang

Table 4. Mean Score for SMAN 1 Malang

		IPA Program			IPS Program		
		2017	2016	2015	2017	2016	2015
1	Mean	76.66	73.27	77.43	79.21	76.13	70.92
	Std. Deviation	(29.99)	(48.68)	(46.27)	(28.74)	(43.88)	(65.27)

Strategies to improve the UNBK score and implementation:

1. Doing socialization of standard operating procedure of UN (POS) and UN exam content outline (kisi-kisi), and conducting workshops for teachers on UN items and higher order thinking.
 2. Doing in-depth material and tutoring begin semester 6. It conducted at 06.30 - 08.30 before starting KBM. On Saturday, the 12th graders were given 4 hours of material deepening.
 3. Applying 5 semester program, in semester 6 students only review and get enrichment of UN subjects.
 4. Carrying out try out which conducted by schools and MKKS, as well as by the Education Office of Malang.
 5. Improving completeness of supporting facilities for teaching and learning process, collaborating with parents and local government.
 6. Improving cooperation and communication among schools, parents and the environment.
- Source: Heni Handayani, November 2017

Case Study 4: SMAK Albertus Malang

Table 5. Mean Score for SMAK Albertus Malang

		IPA Program			IPS Program		
		2017	2016	2015	2017	2016	2015
1	Mean	72.75	65.93	73.65	71.39	63.17	67.57
	Std. Deviation	(36.37)	(55.49)	(47.20)	(31.86)	(52.90)	(36.55)

Strategies to improve the UNBK score and implementation:

1. Doing socialization of POS and UN exam content outline (kisi-kisi) and conduct workshops to teachers on UN issues and higher order thinking.
2. Doing in-depth material and tutoring to students starting in the 6th semester, conducted before KBM.
3. Attending the semester 5 semester program. On the 6th semester, class 12 only review and enrich the subject of UN.
4. Doing in-depth material is carried out by school teachers, and evaluated by principal and vice principal of curriculum.
5. Carrying out try out made by schools and MKKS.
6. Improving completeness of supporting facilities for teaching and learning process, cooperating with parents and government.
7. Improving cooperation and communication among schools, parents, and surrounding environment to socialize POS UN.

Students who enter this school are quite heterogeneous. It appears from the composition of students that 50% come from various provinces in Indonesia, and not all students have high academic achievement. The role of the principal in motivating students through regular visits to each class seems to have benefit for academic achievement.

Source: Heni Handayani, November 2017

Case Study 5: SMAN 2 Palangkaraya

The Central Kalimantan Province (Kalteng) has become one of the concerns due to a significant progress for the IPA program score. By 2016, Central Kalimantan has an average score of UNBK of 47.64 (national average of 54.38) rose to 54.27 in 2017 (national average of 57.15). It is very interesting to be explored and searched for the cause.

Strategies to improve the UNBK score and implementation:

1. Carrying out three times try out, and once conducted by the Provincial Office of Education
 2. Carrying out a Learning Clinic with aimed at assisting students who have learning difficulties.
 3. Carrying out a Peer Tutoring by creating opportunity for higher score students to study together with lower score students
 4. Intensifying the reinforcement of subjects starting from grade 12
 5. Constructing the predicted exam content outline (kisi-kisi) that will appear at the UN
 6. Constructing many items coming from each basic competency (KD)
 7. Providing undigitized item banks managed by school and teachers
- Source: Bagus Prakoso, November 2017

Case Study 6: DIY Provincial Office of Education

Strategies to improve the UNBK score and implementation:

1. The Provincial Office of Education coordinates with the District/City Office of Education to improve the UN ranking.
2. Conducting quality assessment test for schools, district, city, and province level
3. Professor Goes to School to motivate students and teachers to be more enthusiastic about learning
4. Providing awareness to parents about the importance of learning for children
5. The Local Government does not grant permission of crowd event at the time of exams
6. Improving awareness of parents to lend a computer for exam purposes

Source: Nuraeni Eka Ningrum, November 2017

Discussion

Innovative Strategies for UNBK Implementation

In discussing to improve education quality through assessing UNBK implementation, ideally not only focus on educational assessment concepts such as item and response quality, exam and scoring process which are too technical. Moreover, it requires multidisciplinary approaches which have conceptual and strategic approaches.

As Van der Berg, et. al. (2011) stated that to improve education quality, it requires to employ six strategies such as (1) Developing capacity within the teaching force, (2) School Management for Instructional Leadership, (3) Strengthening relationships of accountability and support amongst stakeholders throughout the school system, (4) Sharpening accountability through better information to parents and education authorities, (5) Improve understanding of the language issues, and (6) Improve the quality of Early Childhood Development (ECD) facilities.

Van der Berg's strategy has indicated the importance of technical and managerial approaches, and multidiscipline. As best practices for UNBK implementation, the five schools are able to employ the five of Van der Berg's strategy with different weight of focus, process, and result. An unclear activity that can not be easily identified is related to improve the quality of Early Childhood Development facilities.

In general, the five schools have four main strategies to improve UNBK scores such as developing teacher competence, socialization of POS UN (standard operating procedure of UNBK), material deepening, and UNBK try out. However, they have innovative strategies that apparently contributed to school achievements and UNBK scores as well.

In implementing innovative strategies at school effectively, school principals and teachers must have competencies of how to build cooperation, participation, and commitment from inside and outside the school. The following table (Table 6) represents the selected innovations of each institution.

Table 6. Innovative strategies: Reflection of Concept and Practice

Innovation	Concepts	Benefits
SMAN 5 Surabaya Giving rewards for the team of subject teachers through competition of academic achievement of among subjects	Competition of academic achievement Chumacero, et al (2016)	"... competition has a positive, statistically significant, and economically relevant educational impact on private & public schools."
SMAN 6 Surabaya Implementing Focus on Learning. The placement of students in the classroom based on permanent administrative criteria and flexible academic achievement	Focus on Learning Glasser (1992)	In a school-reform effort needs to enhance the quality. Education is the process through which we discover that learning adds quality to our lives.
SMAN 1 Malang Conducting workshops for teachers on UN items and higher order thinking skills (HOTS)	HOTS (Barnett & Francis 2012) (Weeden, Winter, and Broadfoot, 2002)	Higher order thinking questions may encourage students to think deeply about the subject matter. The instrument assessment of higher order thinking can give stimulation as assessment for learning to develop students' higher order thinking.
SMAK Albertus Malang Improving communication and cooperation with student parents and government, and completeness of supporting facilities for teaching and learning process.	Parental Involvement (Borgonovi, 2012)	Parental Involvement can amplify a positive impact. The role of mediators (school) can be crucial for creating and maintaining trust among the school, pupil, family and community
Innovation	Concepts	Benefits
SMAN 2 Palangkaraya Peer Tutoring, giving opportunity for higher score students to study together with lower score students	Peer Tutoring Dineen, J. P. et al (1977)	Peer tutoring is profitable for the tutor as well as the tutee, provide a basis for recommending peer tutoring as one method of individualizing education.

Lesson Learned from DIY: Participation and Cooperation

D.I. Yogyakarta province (DIY) in many performances provides best practices not only in the education sector like UN, UNBK, IIUN and UKG (teacher competency test), but also in good governance. DIY position on the governance index is at the first rank (IGI Report, 2012). Good governance, character education, and local wisdom have a positive contribution to the quality of education including the implementation of UN and UNBK (Prakoso, 2017b).

In the context of education quality, the Provincial Office of Education has an innovative program which called Professor Goes to School. This program motivates students and teachers with aims to improve the educational equality and quality for education unit in DIY. When the program can be realized, people no longer need to flock to school in the capital city of DIY.

Associated with the UNBK implementation, Provincial Office of Education promotes awareness of parents to lend a computer for exam purposes. The purpose of this activity is the implementation of UNBK 100%. The result is quite successful and competitive when compared to DKI Jakarta province which has the highest education budget in Indonesia (22.3 percent).

In practice, both programs strongly require participation and cooperation. In cultural values, some schools (e.g. SMPN 4 Sleman DIY) practice some values of dedication, habituation, strong example, and how are good and right (*apik'e piye, benere piye*). These daily values have been supported by the teacher's accompaniment for the students from the incubation process until the hatching process (interviewed by Bagus, September 5, 2017).

At the province level, it might be observed from its policy governance. In December 2010, DIY has launched the Spirit of Mutual Cooperation called "*Agawe Majune Ngayogyakarta*" (*Segoro Amarto*). *Segoro Amarto* principle is independence, social awareness, mutual help, and discipline. *Segoro Amarto* policy aims to enhance social justice, and make life more comfortable, prosperous, and independent (Suroatmojo, 2015).

The lesson learned of this case that governance's participation within school can be carried out through active participation of school committees consisting of various stakeholders. All elements of school stakeholders work together. Good participation to cooperate can occur because there are supportive sociocultural factors. In Javanese culture, mutual assistance and interpersonal skill are part of the internalization process in capability development (Wardani, et al. (2013).

Education and Governance: Equality and Integrity

Khan (2003) comprehensively stated that governance is a multifaceted concept with wide ramifications. No country can afford to continue with a governance system that is outdated, slow, ineffective, expensive, and corrupt in this age of globalization.

In measuring governance, it measures the compliance of government and bureaucracy on the six principles of good governance such as transparency, participation, accountability, fairness, efficiency and effectiveness (<http://fia.ub.ac.id/wp-content/uploads/2014/01/handout-pgi.pdf>). Governance practice in education quality can be traced and identified from the average score of the Integrity Index of National Exam (IIUN). IIUN is an instrument to measure integrity of students when they participate in UNBK. To this case, British and Irish Ombudsman Association (2009) stated that "integrity" is part of six principles in governance. Then, Aulich stated that integrity agencies as one pillar of integrity through development of a system (Aulich, 2011).

People may state that we have not any doubt to those five schools as best practices. They can do anything they want. It is because these schools have much better of family and social economic background. For this matter, Gamoran, Secada, & Marrett (2000) stated that student's family background is far more important school social composition and school resources for understanding student outcomes – still retains much of its currency. How are the other schools in Indonesia that the majority they are inadequate of input, capacity, stakeholders, and other resources?

Connected to that problem, the researcher states that the adequacy of input, capacity, stakeholders, and other resources at school level can be felt directly the significance. However, at the macro level, sufficiency of those advantages is not enough. Other factors affecting academic achievement or education quality are related to teacher competency and governance.

Prakoso (2017b) has found that inadequate quality of governance, unsupportive socioeconomic and cultural factors apparently become the reasons for weak quality of education in Indonesia. That statement is affirmed by Office of Democracy and Governance (2003) that good governance provides policy and legal mechanisms which enable countries to address issues of educational equity, support education for all, provides for citizen participation in the design and oversight of public services.

Data in table 7 may provide a comparative description among governance performance (Indonesia Governance Index or IGI), teacher competence or UKG (Muzenda, 2013), and educational budget on education quality indirectly.

Table 7. Performance of Provincial Governance

N	Provinces with highest UNBK score	IGI Ranking	IGI (2012)	UKG (2015)	Education Budget (%)
1	DI. Yogyakarta	1	6,80 (high)	67,02	9,7
2	Jawa Timur	2	6,43 (high)	60,75	1,7
3	DKI Jakarta	3	6,37 (high)	62,58	22,3
4	Bali	5	6,23 (high)	60,12	3,7
5	Kalimantan Tengah	12	5,95 (medium)	51,78	3,0
6	Jawa Tengah	16	5,88 (medium)	63,30	2,9
7	Bengkulu	31	4,81 (low)	54,13	7,6
8	Maluku Utara	33	4,45 (low)	44,78	9,2
	National			56,69	

Source: IGI Report (2012), npd.data.kemdikbud.go.id/, and <http://www.kemendagri.go.id/news/2014/10/15/ini-hasil-tata-kelola-daerah-versi-igi>

As an instrument, IIUN is quite effective to reduce the systematic dishonesty for every school implementing UN. It can be noted that there was improvement of integrity index on 24 from 34 provinces observed (<http://www.cnnindonesia.com/nasional/20160510011843-20-129580/indeks-integritas-sma-meningkat-nilai-ujian-nasional-turun/>). In this case, Prakoso (2017) has a more specific opinion that is employing IIUN is quite effective to enhance academic integrity for a particular scope.

The UNBK implementation which connects to IIUN result actually created some challenges. As stated by Haryo (2017) that the geographical factor and difficulty of access are also suspected to have an impact on the quality of information system, monitoring and evaluation, and exam implementation. Besides that, supporting facilities and infrastructure (electricity, computer laboratory, and internet) are strongly suspected to affect the level of the UN result in integrity and objectivity context.

Conclusion

Based on the case studies and conceptual reflections, this study proposes some hypothesis that firstly, in order to improve UNBK score and school achievement requires technical and strategic approaches. Secondly, in order to improve UNBK score and education quality in the macro (broader) level, the technical and strategic approaches at each school should be supported by participation and cooperation (governance) among stakeholders (schools, community, government, and business sector) which supported by social culture strength.

References

- Aulich, Chris, 2011. *Integrity Agencies as One Pillar of Integrity and Good Governance*. Public Policy and Administration. Vol. 10, No. 1 (p41-52)
- Barnett, J. E and Francis, A.L. 2012. Using higher order thinking questions to foster critical thinking: a classroom study. *Educational Psychology: An International Journal of Experimental Educational Psychology*.
- Boissiere, M. 2004. *Determinants of Primary Education Outcomes in Developing Countries*. Washington DC: World Bank.
- Borgonovi, F. and G. Montt (2012). *Parental Involvement in Selected PISA Countries and Economies*. OECD Education Working Papers, No. 73, OECD Publishing. <http://dx.doi.org/10.1787/5k990rk0jsjj-en>
- Chumacero, R. A., Mardones, J. G., Paredes, R. D. (2016). *Pressures and Academic Performance in Chile*. *Estudios de Economia*. Vol. 43 No. (pp217-232) <http://www.scielo.cl/pdf/ede/v43n2/art03.pdf>
- Creswell, J. W. (2009). *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*. 3rd Edition. Los Angeles: Sage Publications, Inc.
- Dineen, J. P., Clark, H. B., and Risley, T.R., (1977). *Peer tutoring among elementary students: educational benefits to the tutor*. *Journal of Applied Behavior Analysis*. Summer; 10(2): 231–238.
- Elsenhardt, K., & Bourgeois, L. J. (1988). *Politics of strategic decision making in high velocity environments: Toward a mid-range theory*. *Academy of Management Journal*, 31,737-770.
- Gamoran, A., Secada, W. G., & Marrett, C. B. (2000). The organizational context of teaching and learning: Changing theoretical perspectives. In M. T. Hallinan (Ed.), *Handbook of research in the sociology of education* (pp. 37–63). New York: Kluwer Academic/Plenum.
- Glasser, W. (1992). *The quality school: Managing students without coercion* (2d ed.). New York: Harperperennial. <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.167.1923&rep=rep1&type=pdf>

- Muzenda, Allexander. (2013). *Lecturers' Competences and Students' Academic Performance*. International Journal of Humanities and Social Science Invention. Volume 3, Issue 1, January. 2013, PP.06-13. Retrieved from [http://www.ijhssi.org/papers/v3\(1\)/Version-2/B310206013.pdf](http://www.ijhssi.org/papers/v3(1)/Version-2/B310206013.pdf)
- Office of Democracy and Governance (2003). *Approaching Education from a Good Governance Perspective*. U.S. Agency for International Development http://pdf.usaid.gov/pdf_docs/Pnac222.pdf
- Prakoso, B. H. (2017a). *Promoting Academic Integrity in Secondary Education*. Turkish Online Journal of Educational (TOJET), December
- Prakoso, B. H. (2017b). *Educational Quality and Governance in Indonesia: Challenges and Impacts*. Proceeding International Conference on Education, Psychology, and Learning (ICEPL). Fukuoka Japan, November 7-9. (pp 6 –18)
- Roebianto, A., Faela, Y., Dwirifqi. M., (2017). *UNBK Best Practices of Selected Municipalities/Districts and UNBK Score Trend at Madrasah Aliyah*. Puspendik: Research Draft.
- Suroatmojo, Wahyu. (2015). *Program Analysis of Segoro Amarto as Implementation of Good Governance in Regional City of Yogyakarta*. Journal of Government Science. Vol. 8, No.1, (43-50)
- Van der Berg, S. et. al. (2011). *Improving Education Quality in South Africa*. Department of Economics, University of Stellenbosch:
- Wardani, S., Kadarohman, A., Buchari, Permanasari, A. (2013). *Java Culture Internalization in Elektrometri Learning Based Inquiry Laboratory Activities to Increase Inter-Intrapersonal Intelligence*. International Journal of Science and Research (IJSR), India Online ISSN: 2319-7064 Volume 2 Issue 5, May 2013
- Weeden, P., Winter, J., & Broadfoot, P. (2002). *Assessment: What's in it for schools?* London: Mohamad Routledge Falmer.
- Yin, Robert, K. (1984). *Case study research: Design and methods*. Beverly Hills, CA: Sage Publications.
- <http://www.ombudsmanassociation.org/docs/BIOAGovernanceGuideOct09.pdf>
<https://resep.sun.ac.za/wp-content/uploads/2012/10/2011-Report-for-NPC.pdf>
<https://www.kemendagri.go.id/news/2014/10/15/ini-hasil-tata-kelola-daerah-versi-igi>
<https://ubk.kemdikbud.go.id/>
<https://un.kemdikbud.go.id/>
<https://www.merriam-webster.com/dictionary/best%20practice>
 (http://www.cnnindonesia.com/nasional/20160510011843-20-129580/indeks-integritas-sma-meningkat-nilai-ujian-nasional-turun)
<http://www.npd.data.kemdikbud.go.id/>, and
<http://www.kemendagri.go.id/news/2014/10/15/ini-hasil-tata-kelola-daerah-versi-igi>

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Protection And Processing Of Personal Data In The Field Of Education And Explicit Consent

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Abstract

The concepts of protection and processing of personal data are two concepts that are closely related to each other. Along with the development and widespread use of technology, as well as becoming mobile, the emergence of personal data has become much easier to collect, store and share. By analyzing these personal data, it has been possible to reach a lot of knowledge about the data owner. In fact, with the beginning of marketing of some of these data, some of which are unknown even to the data owner, data owners have become anxious and this has become a violation of the fundamental rights and freedoms of others and harming them. For this reason, regulations for the protection and processing of personal data have begun to be made. In this context, the education they have received, the content of this education, and a lot of data about it can be included.

Some basic principles on the processing of personal data have been adopted. The first of these principles is that the process must be in accordance with the rule of law and honesty (*bona fide*). In addition, the processed data must be accurate and up-to-date. Another requirement is that the process is done for specific, clear and legitimate purposes. The processed data may be stored for as long as is required by the legislation or for the purpose for which it is being processed.

As a rule of thumb for the processing of personal data, the explicit consent of the data owner is required. In some cases, this explicit consent is not sought. In addition, some personal data are treated as private personal data, and different requirements are sought for their processing. Explicit consent, which is a condition for the processing of the data, must be given in relation to a specific issue. The person to be recruited must also be informed. The consent to be received from the data holder may be in writing, verbally, or by email.

Introduction

The development of social life and its increasingly complex nature also result in the further spread of our own data. This personal data belonging to us is often not a mystery. Many of our information, such as our name, telephone number, home address, whether we are working or not, our business address, our marital status, our family, and so on, are personal details that are not confidential. Even if this data is not disclosed by us, it can be obtained from external observation and simple research. On the other hand, people may want to conceal this data which belongs to them for many reasons. They may not want their job or their marital status or their religious beliefs or values to be known by others. This is because the information that others will obtain about themselves can be used to harm them again (Gürpınar, 2017, p. 681-682).

We do not have to physically come together to communicate with others in the information age we are in and we do not need to be physically at the same place to transfer our information and data to others. Even in order to transfer personal data to more than one person, there is no need to perform separate transactions. Our own data can be delivered via the internet in very different places in the world and in the hands of millions of people. This data, which is processed through developing computer programs, can be used to obtain many results about ourselves that we do not even know about. These results can be used against the data holder or against the society in which he lives and even against the country that we live in. It is perhaps the most innocent way to make an unfair advantage over this data. For this reason, the data belonging to the persons must be protected and should not be processed without the permission of the owner. However, the concept of personal data is such a broad concept that protection and processing must be linked to certain rules. For this purpose both in Turkey and in the European Union, some regulations related to the protection of personal data processing are made.

Regulations Regarding The Processing And The Protecting Of Personal Data In Turkey And The European Union

Regulations In The European Union

The European Convention on Human Rights, adopted by the Council of Europe on 4 November 1950, is regarded as the first accepted regulation on the protection of personal data. It was recognized that the regulation on private life and the right to protection of family life contained in Article 8 of this Convention could also be enforced in the protection of personal data (Akgül, 2017, 181). The Council of Europe later adopted in 1981 the Convention for the Protection of Individuals with regard to Automatic Processing of Personal Data (ETS No. 108). The purpose of the adoption of this convention is to identify the principles to be considered by public and private

organizations in the protection of personal data and to set an example for legislation to be taken at the national level in this respect (Kılınç, 2012, 1112).

In 1995, the European Parliament and the Council adopted Directive on the Protection of Individuals with regard to the Processing of Personal Data and on the Free Movement of Such Data (Directive 95/46/EC) and this Directive entered into force in 1998. The European Parliament has reorganized a regulation adopted on 27 April 2016 and published on the Official Journal of the European Union on 4 May 2016.

This regulation, called " Regulation (EU) 2016/679 of the European Parliament and of the Council of 27 April 2016 on the protection of natural persons with regard to the processing of personal data and on the free movement of such data, and repealing Directive 95/46/EC", came into force on 25 May 2018 and Directive 95/46/EC was repealed.

Regulations In Turkey

The basic arrangement in the national legislation concerning the processing of personal data is the article 20/3 added to the Constitution with the amendment made by the law no 5982. According to the relevant regulation: "Everyone has the right to ask for the protection of their personal data. This right contains; informing the individual about his or her own personal data, accessing it, requesting correction or deletion of it, and finding out if it has been used for its purposes or not. Personal data may only be processed in the cases provided for in the law or in the explicit consent of the person. The principles and procedures for the protection of personal data are regulated by law. "

Although the right to protect personal data was included in the Constitution in 2010, the Law on the Protection of Personal Data No. 6698, which regulates the procedures and principles related to this, entered into force on 7 April 2016. With this law, personal data has been defined, from this date it has become clear that personal data, in which situations, and against which acts and how it will be protected.

Concept Of Personal Data

The concept of personal data is defined in Article 3 of the law on the protection of personal data as "any information relating to a specific or identifiable real person". On the grounds of the law, not only the name, surname, date of birth and history of the individual, at the same time, information about the physical, family, economic, social and other characteristics of the person should also be evaluated within the scope of personal data. All the issues involved in the content of the concept of personal data are outlined In this decision of the Constitutional Court (see: 2013/122-2014/72 9/4/2014):"The concept of personal data refers to all information about a person who can be identified or identified. In this context, it is not only the information that reveals the individual's identity, such as name, surname, date of birth and place of birth; but also the informations of IP addresses, e-mail addresses, hobbies, preferences, contacts, group memberships, contacts, phone numbers, motor vehicle number, social security number, passport number, resume, picture, image and sound recordings, fingerprints, genetic information and all data that can be identified directly or indirectly, are included in the personal data".

Undoubtedly, personal data are not limited to these. The information on a student's test paper, the types and names of books he or she has received from the library, the sites and the searches made using the school's internet connection can also be considered as personal data.

Thus, personal data does not only contain information about the person's private life, but also includes all the information and data, including economic and professional information, that characterize a person as a particular person or person by revealing its identity (Akgül, 2014, p. 24).

Sensitive Personal Data

In statutory regulations on the protection of personal data, some data are subjected to more specific protection than other personal data due to their importance and sensitivity. The reason for this is that if these data are passed to the hands of malevolent people, they will be able to cause much more damage and discrimination in terms of data owners and other interested persons. In the Law No. 6698, sensitive personal data is not defined.

However, in Article 6 of the Law, the data relating to biometric and genetic data with data related to race, ethnicity, political thought, philosophical belief, religion, sect or other beliefs, costume and clothing, association, foundation or trade union membership, health, sexual life, criminal conviction and security measures, are classified as personal data.

Educational institutions should evaluate the qualitative data of students, teachers and other personnel as private personal data and should be more careful in protecting and processing these data. The use of very sensitive data such as handprints or fingerprints or retina scan of students and teachers at school entry should also be considered in this context. Because some studies on fingerprints have shown that biometric data can reveal some sensitive data such as health or racial or ethnic origins (Örnek Büken/Zeybek Ünsal, 2017, 42).

Concept Of Processing Personal Data

Processing of personal data is any process performed on the persons data. In the article 3 of Law No. 6698 any process performed on the data like obtaining personal data by the full automated or partially automated ways or non automated system which the part of any recording system, Recording, storing, preserving, altering, rearranging, disclosing, transferring, taking over, classifying or storing personal data is processing personal data. There are some important considerations to consider when processing personal data. Law no. 6698, Article 4, considered the principles to be considered in the processing of personal data. According to this article, first of all, personal data must be handled in accordance with the law. For example, the monitoring of the communication of persons should be carried out in accordance with the law. The processing of the data must also be in accordance with the rule of honesty. In the process performed by the data controller on the request of the concerned person, it has been determined that the requesting by the data controller a non-necessary document contains personal data from the customer, is in violation of the honesty rule.

Another condition for the processing of personal data is correct and, if necessary, up-to-date. This is also an obligation for the data controller as it is right for the data subject. The disclosure of a student's absenteeism information after many years of graduation and after being a civil servant violates the condition of being up to date. The processing of personal data must be carried out for specific, clear and legitimate purposes. The processing of identity and contact information of a gym wear shop customer can be considered within the legitimate purpose. However, it is not the legitimate aim of the customer to process blood groups.

The processing carried out in relation to personal data should be measured, limited and connected with the purpose for which the data are processed. The request and recording of the name and surname of a student enrolled in the school is reasonable. However, ethnicity or the religion or sect of the union or the child whose father is a member is not linked to purpose. The final principle that the Act requires to be considered in relation to the processing of personal data is that the processed personal data is retained for the time required for the purposes for which it is prescribed in the relevant legislation or for the purpose for which it is being processed. This also concerns the right to be forgotten at the same time (see, Çelik, 2017, 395-404).

Conditions Of Processing Of Personal Data And Explicit Consent

In order for personal data to be processed, the person concerned must expressly consent to it and give his explicit consent. The law defines the explicit consent. According to Article 3/1 of Law No. 6698 "relating to a specific topic, which is based on informed consent and free will-described" it is explicit consent. The first condition for validity of explicit consent is related to a certain issue. A consent, including general and all circumstances, is void (Kaya, 2011, 326). The consent given should be given as specific to a particular situation and the specific event to be processed must be clearly defined (Küzeci, 2018, 241). explicit consent can be obtained by comprehensively disclosing the purpose of processing sensitive data, as well as by recognizing the possibility of consent to the transaction through the corresponding sign or signature box (Küzeci, 2018, 243). On the other hand, if it has been stated that it is the consent of the person to remain silent, and no consent has been obtained and no explicit consent has been obtained when he remains silent.. The best way to avoid any problems is to get written consent.

Another condition for the validity of the explicit consent is the person to be received his consent must be informed about it. Explicit consent is a declaration of intent. For this reason, he must know what he consents to so that he can consent freely. This situation is also related to the concept of " Data Controller's Obligation to Inform " in Article 10 of the Law. People not only on the subject, but also on the results of the consent must have full information. Information should be understood in a clear and understandable manner in all matters relating to data processing. The information must be done before the processing of the data. The nature of the data to be processed will determine the level of information at the same time. The enlightenment of the person concerned also reflects the right of the person to determine his own future. The last condition for validity of the consent is that the of the consent must be given by free will. Consent, which is the declaration of will of the person, will be valid if it is aware of the behavior of the person and if his decision is his own decision. Any kind of verbal or physical act that interferes with the will of the person also interferes with the consent for processing of personal data. It is not possible for a person to decide freely in situations where force, threat, error, or trickery, which inflicts injury on the will. Therefore, in such cases, a statement of free will can not be mentioned (Kaya, 2011, 326). However, all the reasons there should be assessed within themselves, and the level of influence on the survey should be determined.. Where the parties are not in an equal position or where one of the parties is influential on the other, careful consideration should be given to whether the claim is granted with free will. Particularly in the case of an employee-employer relationship, where the possibility of not consenting to consent is not effectively provided or when the in the case of not consentinf of the employee may cause a likely damage to himself, it can not be assumed that the claim is based on free will. Likewise, the consent obtained by pressure on the student in the teacher-student relationship framework in educational institutions does not apply. In the European Union, explicit consent is only required for the processing of special (sensitive) data. In Turkey, as a rule, explicit consent is required to process all kinds of personal data. In this regard, the Law foresees more protection than the regulations of the European Union.

Other Conditions For Processing Data Being Clearly Mentioned In The Law

Where the processing of personal data is clearly prescribed in the law, no explicit consent of the person concerned is sought. In accordance with the Code of Criminal Records, the Ministry of Justice's processing of persons' criminal convictions may be given as an example of cases explicitly mentioned in the Acts. Again, in the criminal procedure law, it is also possible for the law to permit the investigation of computer programs, computer records and computer files if the requirements of the law exist.

Finding Actual Impossibility On Receiving Consent

The second state in which no explicit consent request is made for the processing of personal data is compulsory for the protection of the life or body integrity of the person himself or someone else who can not explain his consent for the actual impossibility. For example, in an educational institution where the teacher has lost consciousness, the use of identity card information to inform his or her relatives or checking blood group or emergency response on an ID card or in a hospital to make an emergency medical intervention for a fainted student (Örnek Büken/Zeybek Ünsal, 2017, p. 43) or detection of telephone signals to locate the student of the scout club lost in the storm. In such cases it is impossible to refer to the consent of the person using the personal data before the processing activity.

Processing Of Personal Data Related To The Establishment Or The Performing Of The Contract

The performance of a contract of sale or transport contract or work contract is possible by learning and using the address and contact information of the shipper, buyer, or business owner. In such cases, it is possible to use the personal data such as address, communication etc. of the contractual parties without explicit consent. However, the personal data received during the contract negotiations should be returned or destroyed if the contract is not established (Develioğlu, 2017, p.60-61).

Being Publicized By The Data Subject.

Personal data publicized by the data subject can be processed in a manner that overlaps with the data subject publicizations and in accordance with the general principles without explicit consent. However, it is important that the definition of the concept of publicization is made correctly and the limit of publicizing is determined. For example, if a person sends his or her data to a mail group of 50 people working on the same team, it can not be talked about publicization. At this point, the intention of the data subject should be taken into account in accordance with the purpose of the Act. An example of a publicization can be the one that someone shared in the open LinkedIn profile. There is no need for the data subject's explicit consent to use / process this data for the purpose of making a job offer by others. It may not be a problem for parents and students to record the school ceremonies and musical events for personal use. However, obtaining the explicit consent of the students and teachers are required to use the picture is taken and used on the school's web page.

Sensitive Data

In statutory regulations on the protection of personal data, some data are subjected to more specific protection than other personal data due to their importance and sensitivity. The fact that this data is subject to more specific protection may lead to even more significant damage to the person concerned if it is violated or misappropriated by malicious persons.

For some authors, important or unimportant separation of personal data is not accurate. All data is important. On the other hand, if there is a violation, as in many legislation, the data that may cause more damage to the owner is called special or sensitive data (see Korkmaz, 2016, 113-114) . When the Directive is examined, it is defined as sensitive data of persons in race / ethnicity, political opinion, religious or philosophical belief, trade union membership, health status and sexual life in paragraph 8/1.

In regulation, the person's racial or ethnic origin, political opinions, religious or philosophical beliefs, trade union membership, health status and biometric and genetic data in addition to data on the sexual life, in addition to the sexual life, sexual preference data also has been recognized as specially qualified personal data.

In Convention No. 108, a person's racial origin, political opinions, religious or other beliefs, and data concerning health and sexual life conviction has been recognized as sensitive data.

In Turkish law, sensitive datas are limited in Article 6 of Law No. 6698. Accordingly, the datas on "persons' race, ethnic origin, political opinion, philosophical belief, religion, creed or other beliefs, costumes and clothing, associations, foundations or trade union membership, health, sex life, with biometric and genetic data on criminal convictions and security measures" are sensitive data.

Sensitive personal data are divided into two categories: "personal data on health and sexual life" and "personal data on other special qualifications other than data on health and sexual life." Accordingly, the datas on "persons' race, ethnic origin, political opinion, philosophical belief, religion, creed or other beliefs, costumes and clothing, associations, foundations or trade union membership, biometric and genetic data, and on criminal convictions and

security measures” may be processed with the explicit consent of the parties concerned or may be processed without the consent of the person concerned provided that it is foreseen in the law.

The personal data concerning health and sexual life only can be processed without seeking explicit consent for the protection of public health, preventive medicine, medical diagnosis, to carry out treatment and care services, planning finances to health services, and management purposes, by the people who are under confidentiality obligations or competent authority and by concerned organizations.

If the educational institution is also a treatment or rehabilitation institution, the sensitive data will be able to process without consent of the data subject.

Conclusions

With the complication of social life, the data about the person began to spread rapidly. For this reason, the need to protect data has increased steadily. For this purpose both in Turkey and the European Union, there have been numerous legal regulations. In these arrangements personal data are protected. It will only be processed with the explicit consent of the person concerned and can be processed without consent in cases specified in the law. Some of the personal data are considered sensitive personal data. the data on “persons’ race, ethnic origin, political opinion, philosophical belief, religion, creed or other beliefs, costumes and clothing, associations, foundations or trade union membership, health, sex life, with biometric and genetic data on criminal convictions and security measures” are sensitive data. The processing of this data is bound to more difficult conditions.

Many data on children and adults are being processed in educational institutions. In order not to violate the rights of data subject, these data must be stored carefully and processed when it is necessary. This process should also be limited in purpose. It appears that violations of the rules on the processing of personal data frequently occur in schools' libraries and web pages. In the processing of personal data of students and teachers, the rules set forth in Act number 6698 should be followed.

References

Aydın Akgül: *Danıştay ve Avrupa İnsan Hakları Mahkemesi Kararları Işığında Kişisel Verilerin Korunması*, İstanbul, Beta Yayınları, 2014.

Cemil Kaya: *Avrupa Birliği Veri Koruma Direktifi Ekseninde Hassas (Kişisel) Veriler ve İşlenmesi*”, İstanbul Üniversitesi Hukuk Fakültesi Mecmuası, C.LXIX, S.1-2, 2011, (pp. 317-334.)

Doğan Kılınç: “*Anayasal Bir Hak Olarak Kişisel Verilerin Korunması*”, AÜHFD, C. 61, S. 3, 2012, (pp. 1089-1170.)

Elif Küzeci: *Kişisel Verilerin Korunması*, 2.b., Ankara, Turhan Yayınevi, 2018,

Hüseyin Murat Develioğlu: *6698 sayılı Kişisel Verilerin Korunması Kanunu ile Karşılaştırmalı Olarak Avrupa Birliği Genel Veri Koruma Tüzüğü Uyarınca Kişisel Verilerin Korunması Hukuku*, İstanbul, Oniki Levha Yayıncılık, 2017.

İbrahim Korkmaz: “*Kişisel Verilerin Korunması Kanunu Hakkında Bir Değerlendirme*”, Türkiye Barolar Birliği Dergisi, 2016, S.124: pp. 81-152.

Nüket ÖRNEK BÜKEN/ Çağrı ZEYBEK ÜNSAL: “*Kişisel Verilerin Korunması Kanununun Biyomedikal Alana Yansımaları Açısından Değerlendirilmesi*,” Hacettepe HFD, 7(2) 2017, (pp. 33–54).

Yeşim Çelik, “*Özel Hayatın Gizliliğinin Yansımaları Olarak Kişisel Verilerin Korunması Ve Bu Bağlamda Unutulma Hakkı*”, TAAD, Yıl:8, Sayı:32 (Ekim 2017), p. 387-406.

Quality Of Life And Literacy In Hemodialysis Patient's Health

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Abstract

Background: Hemodialysis keeps patients alive, soothes the symptoms of the disease, prevents complications and can interfere with patients' quality of life (QOL), especially when they do not have optimal levels of health literacy, a combination of cognitive and social skills. In other words, health literacy refers to the ability people possess to achieve the promotion and maintenance of their health, thus, enhancing their quality of life.

Objectives: To identify which socio-demographic and clinical variables may influence the QOL experienced by patients with hemodialysis; to determine the relationship between those patients' QOL and their health literacy.

Methods: A quantitative, descriptive, correlational and cross-sectional study with 100 patients suffering from renal failure who were undergoing hemodialysis at the Tondela-Viseu Hospital Center and at the Beirodial Medical Center and Dialysis Center in Mangualde. Most of the participants were male (56.0%) and elderly patients (70, 0%), with a mean age of 68.85 years (± 12.376 years). The data collection instruments used were socio-demographic and clinical characterization questionnaires: the European Health Literacy Questionnaire (HLS-EU-Q), the Health Literacy Survey (HLS-EU-PT) (Nunes & Soresen, 2013) and the Kidney Disease and Quality of Life Questionnaire KDQOL SF TM1.3.

Results: Men manifest a better QOL in dimensions like the quality of their cognitive function, the quality of their social interaction, of their sleep, of the social support they receive, of their overall health, of their emotional function and of their vitality; women show a higher health level in dimensions like the perception of the symptoms / problems of the disease, of the impact of the kidney disease on their daily life, the intensity of the burden of their disease, the kind of professional activity they have been able to carry out during that stage, the kind of encouragement they receive from the staff who work in dialysis centres, the perception of their physical function and physical performance, the level of pain they have been enduring, their emotional performance and the quality of their social function. Adult patients show better QOL when they refer to the perception of the symptoms / problems related to the effects of kidney disease on their daily life and on their professional activity and on the quality of their social interaction, the kind of encouragement they get from people who work in dialysis centres, a better perception of QOL in relation to their physical performance, to the intensity of pain, to their emotional performance and social function. Patients with a lower school education have a better perception of their QOL in aspects related with the intensity of the burden of disease, their cognitive function, the quality of their social interaction, their satisfaction, their physical and emotional function and the kind of vitality they are experiencing. Patients with a higher school level have a better perception of their QOL in dimensions like the professional activity they have been able to perform, their sleep quality, the social support they receive, their physical performance, their general health and emotional performance levels. Patients living in rural areas manifest a better QOL in dimensions like the perception of the symptoms / problems caused by their condition, of the effects of the kidney disease on their daily lives and on their professional activity, of the kind of

encouragement they get from the dialysis centres staff, of their physical function and performance; they also reveal a more positive perception of QOL in factors related to the pain they have been enduring and the quality of their social function. Patients who live alone, without a partner, and who spent more time in their dialysis sessions present a better perception of their QOL. Patients whose treatment involves arteriovenous fistula present better QOL in dimensions that involve their perception of the effects of renal disease on their daily life, the condition of their cognitive function, the quality of their social interactions, the social support they receive, the quality of their physical performance, the level of pain they are enduring, the quality of their emotional function and performance and the vitality they have been feeling. Patients with an inadequate health literacy present better QOL in aspects that have to do with the burden of the kidney disease, with their cognitive function, their sleep, the social support they are provided with, their level of satisfaction, a better QOL related to their physical function and performance, to their emotional function and performance and to their level of vitality.

Conclusion: The results suggest the need for a greater development of intervention plans that may contribute to improve health literacy levels, a kind of intervention that will have a direct impact on the optimization of the quality of life of hemodialysis patients.

Introduction

Health literacy is much more than the general ability to read. Nowadays, people often have to face complex health information and to make therapeutic decisions. This process involves the need to analyze and assess reliable and quality information, to analyze the risks and benefits involved, to calculate the doses of the medicine they have to take and to interpret some of the results of their medical examinations (Sorensen, 2012; Fernandes, 2012).

Health literacy refers to that learning process through which any learning and active person will become aware of the inner capacities they possess and that are essential to develop competencies that will enable them to better understand, manage and assess knowledge in order to achieve a better health promotion. Health literacy implies the existence of a good level of knowledge, personal capacities and confidence in order to boost personal and community health by changing lifestyles and living conditions (Almeida, Silva, Gaspar, & Fonseca, 2014).

Health literacy is a right that belongs to every citizen and constitutes an important determinant of their health and quality of life (QOL) and that, on the other hand, reflects social inequalities. This kind of literacy includes psychological factors, such as motivation and the patient's perception of his own self-efficacy, social and environmental factors that will have an impact on health-related options and behaviours (Loureiro, 2015). Health literacy is the result of health promotion actions that include policies to reduce inequalities and the production of environments that are meant to promote healthy choices, health education, social mobilization and empowerment strategies (Loureiro, 2015).

Health literacy encompasses the patients' ability to communicate with health professionals, to read medical information, to make decisions about treatments, to follow medical regimes, and to decide when and how they need to seek medical assistance. Several studies have shown that poor health literacy, in spite of being a more prevalent condition in populations with poor economic resources, affects people of all ages, races and socioeconomic levels. Health literacy is associated with health care results (Fernandes, 2012).

Bearing all this in mind, it becomes clear that health literacy requires a holistic intervention and the use of a clear and understandable language that will make information accessible to everyone and will improve the patients' capacity to deal with the disease, will enable them to properly access health services and to better understand the situation they are going through and that will guide them as they seek the most appropriate solutions (Loureiro, Dinis, and Oliveira, 2012).

Literacy bears a close relationship with the patients' school level and involves knowledge, motivation and competencies that will enable patients to access, understand and appraise any kind of health-related information that will provide them with knowledge to make the right decisions about their health and its promotion and about the prevention of diseases, as a way to maintain or improve their QOL standards (Sorensen, Van den Broucke, Fullam, Doyle, Pelikan, Slonska, & Helmut, 2012).

Patients' literacy influences directly the kind of access they may have to crucial information about their rights and about health care, whether it involves following instructions about a certain treatment or therapeutic, understanding the information they are given and that is related to their disease or learning about disease prevention or ways to achieve health promotion (Luís, 2010).

Literacy levels can directly affect patients' access to health care. Poor literacy, which often goes hand in hand with feelings of embarrassment or shame, can reduce patients' ability to expose their fears (Loureiro, 2015).

In the early 90s, Shumaker and Anderson (1992), referenced by Albuquerque (2009), defined QOL as the overall individual satisfaction with life and the general and personal feeling of wellness. Cramer (1994), also quoted by

the same author, defined it as a state of complete physical, mental and social well-being and not merely the absence of disease and infirmity.

Following that same line of reasoning, those arguments are once again referred when the World Health Organization (WHO), in 1994, states that QOL is the individual perception that people have of their attitude in life in the social, economic and cultural context where they belong, taking into account their culture, values, life goals, social relationships and life expectations. Paschoal's definition (2010) is very similar as he defines QOL as an individual's perception of their position in life in the context of the culture and value systems in which they live and in relation to their goals, expectations, standards and concerns. In Silva's perspective (2011), QOL can be composed of several levels and may be represented by a three-level model: in the first level, we can find the person's overall quality of life; in a second level, we will find the physical, psychological and spiritual dimensions; and finally, there will be a level that will include the different elements that will form each dimension (for the physical dimension there will be elements like pain, vomiting, functional disability, among others).

The QOL of a population depends on the living conditions - of its inhabitants, on whether or not they have access to certain economic and social goods and services like employment, a wage, basic education, adequate food, the access to good health services, basic sanitation, good housing conditions, good quality transport services, among other factors.

It is important, in this context, to stress that the concepts of well-being and of QOL vary from society to society, in accordance with each culture (Silva, 2011). The same author points out that each person is unique and that his/her needs vary. This uniqueness will influence the opinion that each one of them have about what is really significant in their lives and what are their priorities,

Beckert, Irigaray and Trentini (2012, p. 235) define QOL as "a dynamic interaction between the external conditions of an individual's life and the internal perception of these conditions". The same authors also mention that QOL relates to the way people live, feel and understand their everyday lives. It includes aspects such as health, education, transportation, housing conditions, work and the individual's capacity to take part in decisions, in different contexts and situations. It can be perceived as a range of meanings and states: the physical, mental, psychological, emotional and social well-being (family, friends, health, education, among others); the emotional state, the social interaction, the intellectual activity, self-care, family support, health condition, cultural and ethical values and religiosity, lifestyle, satisfaction with our job and/or with daily activities and the environment in which one lives. Thus, it is a concept that varies from author to author, because of its subjectivity, and that depends on each person's socio-cultural level, age group and personal aspirations (Beckert, Irigaray & Trentini, 2012).

According to Diniz and Schor (2006), references to QOL in a clinical discussion are natural and necessary, but, since the concept may be used in many senses, its use can cause some confusion, and that is why some distinctions must be made: a) the judgment of what is a poor QOL can be done by those who lives it or by an observer. It often happens that lives that observers consider to be of poor quality are quite satisfactory for those who live them; b) a poor QOL can generally mean that the patient's experiences fall short of the individual's desirable standards; c) The assessment people do of their QOL, as with life itself, changes over time; d) This evaluation may reflect certain bigotry and prejudice; e) The assessment can reflect socio-economic conditions rather than the life experienced by the patient.

There are some objective criteria we can use to define the QOL, namely:

a) Restricted QOL-it is an objective and appropriate description of a situation in which a person suffers from serious physical or mental health problems, in other words, the patients' functional capacities do not fall within the definition of "human normalcy". This judgment can be carried out by the person who is living that situation or by others who observe that person. It is quite clear that the assessment performed by the observer and the judgment carried out by the person who is living that kind of life may differ;

b) Minimum QOL – it is an objective description adapted to a situation in which a patient or an observer (a nurse or a family member) faces a person whose overall physical situation has considerably worsened, whose ability to communicate with others is severely restricted and who suffers from discomfort and pain;

c) QOL below the minimum – it is an objective description that stands for a situation in which the patient exhibits extreme physical weakening and a complete and irreversible loss of sensory and intellectual activity. It may even be suggested that in this state patients have no QOL whatsoever. This description applies to people who are in a persistent vegetative state (Diniz & Schor, 2006).

Cannavarro, Pereira, Moreira and Paredes (2010) claim that there are two different types of instruments that can be designed and used to assess QOL: general and specific instruments. We apply general instruments to obtain values that are not specifically related to a single kind of problem or disease. Those instruments will provide results that will be used to compare the overall health status of two different groups of medical subjects. The specific instruments are less comprehensive. They will only be useful to describe dimensions that involve a specific disease or problem and will be relevant when we compare patients whose specific characteristics are the only factor that matters to define the final output.

Noronha, Martins, Dias, Silveira, De Paula and Haikal (2016), based on the Heath definition provided by WHO, claim that QOL should be analysed and understood according to four different domains: occupational and physical functioning; psychological state; social interaction and somatic sensations. On the other hand, the same authors state that HRQOL (Health-Related Quality of Life) can be met when the individual experiences satisfactory functionality in three main domains: physical, psychological and social.

As far as the physical domain is concerned, someone who suffers from chronic pain is unable to carry out most of his regular daily activities, because his functional capacities will be affected. This situation will also affect the patient's personal fulfilment and his psychological, social and financial well-being. Physical suffering has a significant impact on all areas of a person's QOL (Noronha et al., 2016).

When we focus on the patient's psychological domain, it become clear that, in order to adapt appropriately to his environment, and to maintain an excellent QOL, people will need to experience healthy psychological conditions: in situations of anxiety or depression people can hardly get any satisfaction from their daily life and it will be very difficult for them to function properly in any of the domains that will contribute to their QOL (Paschoal 2011).

As for aspects that will have an impact on a patient's social domain, it is clear that in situations where the disease leads to a physical limitation, the patient's role/social status will undoubtedly be affected as he will no longer be able to perform his professional or social activity . In such situations the support provided by family members, friends and health care professionals is fundamental (2011, Noronha et al., 2016).

It is important to emphasize the role played by the perception that each individual has about his or her own health condition or about his/ her well-being, because there is no one better than this individual to express his personal experiences. After overcoming the acute phase of a disease, patients usually go through a process of adjustment to their new life as they look for a lifestyle that can be tolerated and maintained, that allow them to preserve their self-esteem and that is adapted to their limitations, while focusing on other aspects of life (Farias & Martins, 2013). Health is regarded as the largest and best resource for social, economic and personal development and as one of the most important dimensions for QOL. According to Pais-Ribeiro (2009), in health care system, terms like QOL and health condition are usually used almost as synonyms while, on the other hand, Hermann and Looney (2011) consider that these concepts are quite different in essence. The same authors explain that QOL is a much more comprehensive concept than health condition, and that the former is one of the most reliable indicators used to assess the latter. The authors also state that the health dimension has the highest correlation value with the overall QOL scoring, in other words, health might possibly be the most important dimension that will influence a person's QOL.

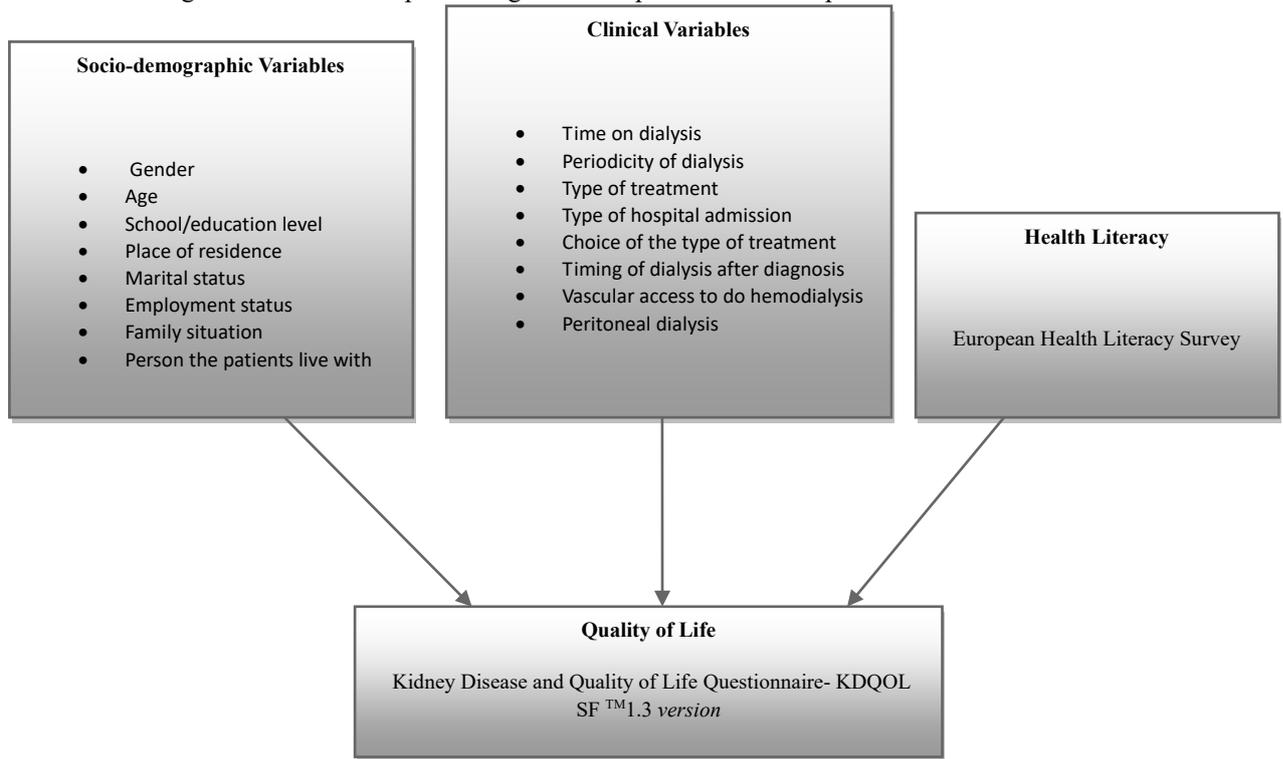
HRQOL has to do with the value people assign to their lives when they are altered by the perception of physical or psychological limitations, when they realize that the disease will have a negative effect on their social functions and life opportunities, when they are affected by the treatments they have to undergo and by situations in which the worsening of the disease is evident. Therefore, HRQOL has become the primary indicator to assess the result of different types of interventions (Serra, 2010).

Diseases that do not disturb the patients' well-being are rare, most of them have a negative impact on the way patients are able to carry out their everyday life activities and on the way their social roles will be performed (Serra, 2010). Chronic diseases require external social and material resources. "The disease is a personal experience, a reality experienced by the individual himself. The perception that each of us has of the disease depends on psychological and social variables that will determine the individual peculiarities that will influence the way each of us will face the disease "(Martins, 2002, p. 34).

The Study

This is a cross-sectional, descriptive and correlational study, since our objective is, in addition to carrying out the analysis and description of the relationships between the variables, to analyze and explain the relationship between those variables. The articulation between the variables included in the current study is shown in a schematic representation (cf. Figure 1)

Figure 1 – Basic conceptual design of the expected relationship between variables



The sample used for this study consists of 100 patients with kidney failure who were undergoing dialysis in a Hospital Centre and in a Medical and Dialysis Clinic. The instruments applied are described in Figure 1.

As far as the participants' socio-demographic data are concerned, the analysis of the results presented in table 1 reveals that the patients with higher representativeness in the sample are elderly people (70.0%) and that 75.0% of the participants are male and 63.6% are female patients.

Through the analysis performed on the participants' school level data, according to their gender, it is clear that more than half of the sample (81.0%) had left school as soon as they completed elementary school (4 years). 80.4% of them are men and 81.8% are women. 11.0% of the patients surveyed had completed middle school (5 to 9 year).

Most of the participants (56.6%) are living in rural areas, but there is also a high percentage of them who are living in urban environments (43.4%). 56.4% of the patients who claimed to be living in the countryside are men and 56.8% are women.

As for their marital status, more than half of the elements of the sample (71.7%) have a partner. 72.7% of the elements of that specific group are men and 70.5% are women. Data made it clear that 28.3% of patients that were part of the sample did not have a partner at the time of the interview.

As far as family composition is concerned, we could observe that the majority of the sample (94.0%) don't live alone. 92.9% of those group members are men and 95.5% are women. Patients who live with someone (N = 94) were asked about the person they were living with. Most of them (66.0%) live with their wives/husbands (71.2% of them are men and 59.5% women), while 17.0% live in the company of their children and 13.8% were living with another person.

Table 1- Sociodemographic characterization of the sample according to the participants' gender.

Variables	Male		Female		Total		Residual		X ²
	N° (56)	% (56,0)	N° (44)	% (44,0)	N° (100)	% (100,0)	1	2	
Age									
Adult	14	25,0	16	36,4	30	30,0	-1,2	1,2	1,515
Elderly people	42	75,0	28	63,6	70	70,0	1,2	-1,2	
School level									
Elementary (4 years, at least)	45	80,4	36	81,8	81	81,0	-,2	,2	n.a.
Middle school (5 to 9 years)	4	7,1	7	15,9	11	11,0	-1,4	1,4	
Secondary school/College	7	12,5	1	2,3	8	8,0	1,9	-1,9	
Place of residence									
Rural	31	56,4	25	56,8	56	56,6	,0	,0	0,002
Urban	24	43,6	19	43,2	43	43,4	,0	,0	
Marital Status									
No partner	15	27,3	13	29,5	28	28,3	-,2	,2	0,062
Living with a partner	40	72,7	31	70,5	71	71,7	,2	-,2	
Family composition									
Lives alone	4	7,1	2	4,5	6	6,0	,5	-,5	n.a.
Lives with someone	52	92,9	42	95,5	94	94,0	-,5	,5	
Person they live with	N° (52)	% (55,3)	N° (42)	% (44,7)	N° (94)	% (100,0)			
Wife/husband	37	71,2	25	59,5	62	66,0	1,2	-1,2	n.a.
Parents	1	1,9	2	4,8	3	3,2	-,8	,8	
Children	7	13,5	9	21,4	16	17,0	-1,0	1,0	
Other(s)	7	13,5	6	14,3	13	13,8	-,1	,1	

As far as health literacy is concerned, data from table 2 clearly show that most patients have low health literacy (93.0%). When the analysis of the results is done according to the patients' age, evidence shows that most of the patients who exhibit inadequate health literacy are elderly people (68.8%). However, the percentage of adult patients with inappropriate health literacy is also quite expressive (31.2%). It turns out that 5 elderly elements (83.3%) present problematic health literacy and only one elderly person (100.0%) shows sufficient health literacy.

After analyzing the results according to the participants' school level, we realised that the majority (80.5%) of the patients who exhibit inadequate health literacy belong to the group of those who had left school early, right after completing elementary school (who have spent 4 or less years at school).

Those who have left school after completing middle school (and who have, therefore, spent between 5 and 9 years at school) came right after (11.8%). When we analysed the cases of patients with problematic health literacy, evidence showed that 5 of them (83.3%) had completed elementary school. The only patient who reveals sufficient health literacy belongs to the group which includes participants with lower school education (table 2).

Most of the patients who show inadequate health literacy live in a rural environment (54.3%), while the remaining 45.7% live in urban areas. All the patients who exhibit problematic health literacy live in rural areas (n = 6; 100.0%) and the only patient with sufficient health literacy comes from an urban environment (table 2).

Taking into account the results about the participants' health literacy according to their marital status, evidence shows that most patients with inadequate health literacy (70.7%) have a partner, while 29.3% did not have a partner at the time the study was conducted. All patients who reveal problematic health literacy (n = 6; 100.0%) have a partner and the only patient who shows sufficient health literacy had no partner at the time (table 2).

It is clear that most of the patients with inadequate health literacy (53.8%) are male, which shows that 46.2% of the female patients also reveal inadequate health literacy. The data gathered also prove that 5 male patients show problematic health literacy (83.3%) and that the only patient who has sufficient health literacy is also a man (table 2)

Table 2 – Health Literacy according to patients’ socio-demographic variables.

Health Literacy Variables	Inadequate		Problematic		Sufficient		Total		Residual	
	n° (93)	% (93,0)	n° (6)	% (6,0)	n° (1)	% (1,0)	n° (100)	% (100,0)	1	2
Age										
Adult	29	31,2	1	16,7	0	0,0	30	30,0	,9	-,7
Elderly	64	68,8	5	83,3	1	100,0	70	70,0	-,9	,7
School level										
Elementary (4 years, at least)	75	80,6	5	83,3	1	100,0	81	81,0	-,3	,2
Middle school (5 to 9 years)	11	11,8	0	0,0	0	0,0	11	11,0	1,0	-,9
Secondary school/College	7	7,5	1	16,7	0	0,0	8	8,0	-,6	,8
Place of residence										
Rural	50	54,3	6	100,0	0	0,0	56	56,6	-1,6	2,2
Urban	42	45,7	0	0,0	1	100,0	43	43,4	1,6	-2,2
Marital status										
No partner	27	29,3	0	0,0	1	100,0	28	28,3	,9	-1,6
Living with his/her partner	65	70,7	6	100,0	0	0,0	71	71,7	-,9	1,6
Gender										
Male	50	53,8	5	83,3	1	100,0	56	56,0	-1,6	1,4
Female	43	46,2	1	16,7	0	0,0	44	44,0	1,6	-1,4
Total	93	100,0	6	100,0	1	100,0				

As for the inferential analysis, the main results show that men reveal higher mean values in dimensions such as cognitive function, the quality of social interactions, of sleep, of the social support they get, of overall health, of their emotional function and vitality, while women reveal better QOL in dimensions like the perception of the symptoms/problems caused by the disease, the impact of kidney disease on their daily life, the level of burden imposed by renal failure, the quality of the professional activity they have been able to carry out, the kind of encouragement they get from the people working in the dialysis centre, the quality of their physical function and physical performance, the fact that they have been experiencing less pain, better emotional performance and better social function.

As far as age is concerned, we found out that adult patients reveal better QOL in dimensions like symptoms/problems, in relation to the impact renal disease has on their daily life, on their professional activity and on the quality of their social interactions. They also state that they get great encouragement from the staff working at the dialysis centre, that they have a better perception of their QOL in relation to their physical performance, to the level of pain they are experiencing and to their emotional and social function. In turn, elderly patients manifest a better perception of QOL in dimensions that have to do with the burden of the disease, with better cognitive function, better sleep, positive social support, greater sense of achievement, positive physical function, better perception of their overall health and of their emotional function and greater vitality.

Conclusions

As far as health literacy is concerned, it has been discovered that most of the patients reveal inadequate health literacy, a finding which is in accordance with the results found by Almeida, Silva, Gaspar and Fonseca (2014) whose research reveals also a higher percentage of patients who present inappropriate health literacy. Those patients are specially adults and elderly people and patients with lower school levels, as shown by the results of the current study, since the vast majority of patients with inadequate health literacy have a low level of education (they left school after completing their elementary education) and are elderly citizens. However, it should be noted that, according to Monteiro (2009), the health literacy profile of a given population cannot be based only on the patients' formal education, since literacy cannot be seen as something that is acquired at a given moment and that is valid forever.

The same author reinforces her position using the assumption that literacy has to be assessed according to any given situation (a disease, for instance) and to the requirements needed to face that problem. It is also necessary to assess the patients' capacity to apply treatment. Health literacy is far from being just a general ability that allows people to read. Nowadays, people often have to face complex health information and therapeutic decisions. To achieve these procedures, patients need to assess the veracity and quality of the information they are given, to analyze the risks and benefits of their decisions, to calculate the doses of medicine they have to take and to interpret some of their test results (Sorensen, 2012; Fernandes, 2012).

The results made it possible to conclude that patients living in rural areas have a better perception of what it takes to have a good QOL in dimensions that have to do with the perception of the symptoms/problems involving the disease, the impact that renal disease might have on their daily life, on their professional activity, the kind of encouragement they receive from the people who work in the dialysis centres, the condition of their function and physical performance, a more positive perception of QOL in relation to the level of pain they were experiencing and to the quality of their social function. Patients living in an urban environment have a better perception of what it takes to have a higher QOL in dimensions that deal with the intensity of the burden caused by the renal disease, with the quality of their cognitive function, the quality of their social interactions, of their sleep, the social support they are receiving, their overall health, their emotional performance and with the kind of vitality they were feeling.

These results reinforce the need for a higher investment in the development of intervention plans to promote health literacy levels among hemodialysis patients, an investment that will surely lead to a better QOL. This suggestion arises precisely because the health promotion actions have to encompass policies that have to take into account the patients' socio-demographic and clinical variables and to allow for the creation of environments that will promote health education and empowerment strategies. This suggestion is also based on the assumption that investment in health literacy implies the use of holistic approaches so that we can develop the patients' capacity to deal with their disease and with the treatment they have to follow and that will improve those patients' QOL.

It should also be noted that HRQOL is associated with higher levels of well-being and patient satisfaction and with a better adaptation to the circumstances arising from that chronic disease and its treatment. Thus, it is imperative that the assessment of the patients' QOL must always be a positive indicator of the kind of health care provided to the patients suffering from renal failure problems, a kind of care that should always be encouraged by the dialysis centres staff. People should always bear in mind that a chronic disease has singular characteristics because of its longevity or because of the certainty that living with a chronic disease will force any patient to adopt choices or behaviours that will enable him to adapt to a new set of challenges and to face the problems that any long-time patient have to go through.

Therefore, the role played by nurses assumes a huge relevance in the improvement of the chronic patients' QOL and it becomes clearer and clearer that, in their daily action, nurses should look at their patient in a holistic perspective, treating him/her like a whole being who is the result of the contributions provided by his social, cultural and psychological dimensions. That way they will play a crucial role in the promotion of their patients' QOL.

In order to improve medical practice, it is crucial to implement better health literacy among patients who are undergoing dialysis, always striving to adapt the medical language to the patients' socio-demographic characteristics and to analyze the context and environments from where the patients are from. It will also be essential to give all the necessary psychological support to each patient, trying to figure whether or not he was provided with the right social support to help him face the whole treatment process. The role played by the patients' family, their involvement in the treatments provided are very important, too, since it is clearly a form of emotional support that will help their loved ones face the hardships caused by their condition.

References

- Albuquerque, L.G. de (2009). Estratégias de recursos humanos e competitividade. In Vieira, M.M.F., & Oliveira, L. M. B.de (orgs.) *Administração contemporânea: perspectivas estratégicas* (pp.215-238, cap. 9). São Paulo: Atlas.
- Almeida, D., Silva, M., Gaspar, R., & Fonseca, S. (2014). *Literacia em Saúde e Estado Nutricional*. Monografia do 22º curso de licenciatura em enfermagem, apresentada à Escola Superior de Saúde de Viseu, IPV.
- Alves, D. S. A., & Gonçalves, A. (2009). Impacto da saúde oral na qualidade de vida dos jovens entre os 11 e os 14 anos. *Revista da Faculdade de Ciências da Saúde*, 6, 296-308.
- Andrade, J.M.O., Rios, L.R., Teixeira, L.S. et al. (2014). Influência de fatores socioeconômicos na qualidade de vida de idosos hipertensos. *Ciência & Saúde Coletiva*, 19(8): 3497-3504. DOI: 10.1590/1413-81232014198.19952013. Acedido em <http://www.scielo.br/pdf/csc/v19n8/1413-8123-csc-19-08-03497.pdf>
- Anes, E.J., & Ferreira, P.L. (2009). Qualidade de vida em diálise. *Revista Portuguesa de Saúde Pública*, 8, 67-82. Acedido em <https://bibliotecadigital.ipb.pt/bitstream/10198/5077/1/Qualidade%20de%20vida%20em%20di%C3%A1lise%20PDF.pdf>
- Beckert, M., Irigaray, T.Q., & Trentini, C.M. (2012). Qualidade de vida, cognição e desempenho nas funções executivas de idosos. *Estudos de Psicologia*, 29(2), 155-162. Acedido em <http://www.scielo.br/pdf/estpsi/v29n2/a01v29n2.pdf>

- Berkman, N., Sheridan, S., Donahue, K., Halpern, D., & Crotty, K. (2011). Low health literacy and health outcomes: An updated systematic review. *Annals of Internal Medicine*; 155(2), 97-107. Acedido em <https://www.ncbi.nlm.nih.gov/pubmed/21768583>
- Canadian Council on Learning (2007). *Health Literacy in Canada: Initial results from the International Adult Literacy and Skills Survey*. Acedido em www.ccl-cca.ca/pdfs/HealthLiteracy/HealthLiteracyinCanada.pdf.
- Canavarro, M.C., Pereira, M., Moreira, H., & Paredes, T. (2010). Qualidade de vida e saúde: aplicações do WHOQOL. *Alicerces*; III(3):243-268. Acedido em <http://repositorio.ipl.pt/handle/10400.21/770>
- Coutinho, N.P.S., Vasconcelos, G.M., Lopes, M.L.H., Wadie, W.C.A., & Tavares, M.C.H. (2010). Qualidade de vida de pacientes renais crônicos em hemodiálise. *Rev Pesq Saúde*, 11(1), 13-17. Acedido em <http://www.periodicoeletronicos.ufma.br/index.php/revistahuufma/article/view/328/243>
- Cunha, S.F.F. (2011). *Qualidade de vida no doente em diálise*. (Dissertação de Mestrado). Escola Superior de Saúde de Viseu. Acedido em <http://repositorio.ipv.pt/bitstream/10400.19/1577/1/CUNHA%20Sonia%2C%20Qualidade%20de%20vida%20no%20doente%20em%20di%C3%A1lise.pdf>
- David, M. I. (2015). *Os perfis de autocuidados das pessoas com insuficiência renal crónica em hemodiálise e a sua percepção da qualidade de vida*. (Dissertação de Mestrado). Universidade Lusófona de Humanidades e Tecnologia Escola de Ciências e Tecnologias da Saúde. Acedido em http://recil.ulusofona.pt/bitstream/handle/10437/6630/Trabalho_Final_In%C3%AAs_30.7.pdf?sequence=1
- DeWalt, D., Berkman, N., Sheridan, S., Lohr, K., & Pignone, M. (2004). *Literacy and health outcomes: A systematic review of the literature*. *Journal of Internal Medicine*; 19(2), 1228-1239. Acedido em <https://www.ncbi.nlm.nih.gov/pubmed/15610334>
- Diniz, D.P., & Schor N. (2006). *Qualidade de vida. Série guias de medicina ambulatorial e hospitalar - UNIFESP - Escola Paulista de Medicina*. Barueri: Manole.
- Farias, G., & Martins, R. (2013). Qualidade de vida da pessoa com doença pulmonar obstrutiva crónica. *Millenium*, 45 (jan/jun), 195-209. Acedido em <http://revistas.rcaap.pt/millenium/article/view/8102/5697>
- Fernandes, P. (2012). *Literacia em saúde: contribuição para o estudo de adaptação e validação do NVS - Newest Vital Sign*. [Dissertação de Mestrado]. ISPA – Instituto Universitário. Acedido em <http://repositorio.ispa.pt/bitstream/10400.12/2287/1/14921.pdf>
- Ferreira, P.L., & Anes, E. (2010). Medição da qualidade de vida de insuficientes renais crónicos: criação da versão portuguesa do KDQOL-SF. *Doenças crónicas*, vol. 28, 1, 31-39. Acedido em <https://bibliotecadigital.ipb.pt/bitstream/10198/5057/1/Medi%C3%A7%C3%A3o%20da%20qualidade%20de%20vida%20de%20Insuficientes%20renais%20cr%C3%B3nicos-cria%C3%A7%C3%A3o%20da%20vers%C3%A3o%20portuguesa%20do%20KDQOL.pdf>
- Fortin, M.-F. (2009). *Fundamentos e etapas do processo de investigação*. Loures: Lusodidacta.
- Greenberg, A. (2005). *Primer on Kidney Diseases*. Em N. K. Foundation.
- Hermann, C.P., & Looney, S.W. (2011). Determinants of quality of life in patients near the end of life: a longitudinal perspective. *Oncol Nurs Forum*; 28(1), 23-31.
- Irigaray, T.Q., & Trentini, C.M. (2009). Qualidade de vida em idosas: a importância da dimensão subjetiva. *Estudos de Psicologia*, 26(3), 297-304. Acedido em <http://www.scielo.br/pdf/estpsi/v26n3/v26n3a03>
- Kobylarz, F., Pornidor, A., & Heath, J. (2006). A mnemonic tool for addressing Health literacy concerns in geriatric clinical encounters. *Geriatrics*; 61(7), 20-27. Acedido em <https://www.ncbi.nlm.nih.gov/pubmed/16827611>
- Kutner, M., Greenberg, E., Jin, E., & Paulsen, C. (2006). *The health literacy of america's adults: Results from the 2003 national assessment of adult literacy*. National Center for Education Statistic, U.S. Department of Education (NCES), 423.
- Leal, C.M. (2008). *Reavaliando o conceito da qualidade de vida*. Universidade dos Açores.
- Loureiro, L. (2015). A literacia em saúde, as políticas e a participação. *Revista portuguesa de saúde pública*, 33(1), 1. Acedido em <http://www.scielo.mec.pt/pdf/rpsp/v33n1/v33n1a01.pdf>
- Loureiro, L. M., Dinis, B. S., & Oliveira, R. (2012). Literacia em saúde Mental de adolescentes e jovens: conceitos e desafios. *Revista de Enfermagem Referência*, III Série - n.º 6 - Mar. 2012, 157-166. Acedido em <http://www.scielo.mec.pt/pdf/ref/vserIIIIn6/serIIIIn6a15.pdf>
- Luis, L. (2010). *Literacia em saúde e alimentação saudável: os novos produtos e a escolha dos alimentos*. [Dissertação de Mestrado]. Universidade nova de Lisboa. Escola Nacional de Saúde Pública. Acedido em <https://run.unl.pt/bitstream/10362/4264/1/RUN%20Tese%20de%20Doutoramento%20-%20Luis%20Francisco%20Soares%20Luis.pdf>
- Machado, G.R.G., & Pinhati, F.R. (2014). Tratamento de diálise em pacientes com insuficiência renal crónica. *Cadernos UniFOA*, Volta Redonda, 26, 137-14. Acedido em <http://web.unifoa.edu.br/cadernos/edicao/26/137-148.pdf>

- Martins, M. (2002). *Auto-actualização e sofrimento na explicação da aceitação da doença crónica: Uma Investigação no Adulto em Tratamento de Hemodiálise*. [Dissertação de Mestrado]. Faculdade de Medicina da Universidade do Porto. Acedido em <https://repositorio-aberto.up.pt/handle/10216/9745>
- Monteiro, M.M.M.C.F. (2009). *A literacia em saúde*. (Dissertação de Mestrado). Universidade Lusófona de Humanidades e Tecnologias Departamento das Ciências de Educação. Acedido em recil.ulusofona.pt/bitstream/handle/10437/.../A%20literacia%20em%20saude.pdf?..
- Múrias, D.F.R. (2015). *Qualidade de vida e ajuste diádico do doente em hemodiálise*. (Dissertação de Mestrado). Universidade Portucalense Infante D. Henrique. Acedido em <http://repositorio.uportu.pt:8080/bitstream/11328/1651/1/TMPS%2052.pdf>
- Noronha, D.D., Martins, A.M.E., Dias, D.S. dos, Silveira, M.F., De Paula, A.M.B., & Haikal, D.S.A. (2016). Qualidade de vida relacionada à saúde entre adultos e fatores associados: um estudo de base populacional. *Ciência & Saúde Coletiva*, 21(2), 463-474. Acedido em <http://www.scielo.br/pdf/csc/v21n2/1413-8123-csc-21-02-0463.pdf>
- Ordem dos Enfermeiros (2016). *Guia Orientador de Boa Prática - Cuidados à pessoa com doença renal crónica terminal em hemodiálise*. Ordem dos Enfermeiros. Acedido em http://www.ordemenfermeiros.pt/publicacoes/Documents/GOBPHemodialise_VF_site.pdf
- Organização Mundial de Saúde (1998). *Health promotion glossary*. Genebra: OMS.
- Pais-Ribeiro, J. (2009). A importância da qualidade de vida para a psicologia da saúde. In: J.P.Cruz, S.N. de Jesus, & C Nunes (Coords.). *Bem-Estar e Qualidade de Vida* (pp.31-49). Alcochete: Textiverso.
- Paschoal, S. P. (2011). Qualidade de vida na velhice. In E. V. Freitas, L. Py, A. Nery, F. X. Cançado, J. Toll, & M. L. Gorzoni (eds). *Tratado de geriatria e gerontologia* (pp. 99-106). Rio de Janeiro: Editora Guanabara Koogan.
- Paschoal, S.C.M. (2010). *Qualidade de vida na velhice*. Portal do Envelhecimento. Acedido em <http://www.portaldoenvelhecimento.org.br/acervo/pforum/>.
- Paskulin, L. G., Córdova, F. P., Costa, F. M., & Vianna, L. C. (2010). Percepção de pessoas idosas sobre qualidade de vida. *Acta Paulista de Enfermagem*, 23, 101-107. doi:10.1590/S0103-21002010000100016.
- Pestana, M.H., & Gageiro, J.N. (2014). *Descobrimos regressão: com a complementaridade do SPSS*. Lisboa: Edições Silabo.
- Praça, M.I.F. (2012). *Qualidade de vida relacionada com a saúde: a perspectiva dos utentes que frequentam os Centros de Saúde do ACES Trás-os-Montes I Nordeste*. [Dissertação de Mestrado]. Instituto Politécnico de Bragança. Acedido em <https://bibliotecadigital.ipb.pt/bitstream/10198/3612/1/tese%20final%20Fevereiro.pdf>
- Safeer R.S., Cooke, C.E., Keenan, J. (2006). The impact of health literacy on cardiovascular disease. *Vascular Health and Risk Management*; 2(4), 457- 464
- Sandra, C.A.L. (2015). *Qualidade de vida em diálise*. (Dissertação de Mestrado). Faculdade de Medicina. Universidade de Coimbra. Acedido em https://estudogeral.sib.uc.pt/bitstream/10316/29744/1/Mestrado%20Sa%C3%BAde%20P%C3%BAblica_QV%20em%20Di%C3%A1lise.pdf
- Santos, C.A.L. dos (2015). *Qualidade de vida em diálise*. (Dissertação de Mestrado). Faculdade de Medicina Universidade de Coimbra. Acedido em https://estudogeral.sib.uc.pt/bitstream/10316/29744/1/Mestrado%20Sa%C3%BAde%20P%C3%BAblica_QV%20em%20Di%C3%A1lise.pdf
- Serra, V. S. (2010). Qualidade de vida: significados e níveis de análise. In & A. In M. Canavarro, *Qualidade de vida e Saúde: Significados e Níveis de Análise* (pp. 23-39). Lisboa: Fundação Calouste Gulbenkian.
- Silva, A. P. da (2011). *A percepção da qualidade de vida do idoso institucionalizado*. (Dissertação de Mestrado). Universidade Fernando Pessoa. Faculdade de Ciências da Saúde. Acedido em http://bdigital.ufp.pt/bitstream/10284/2675/3/T_18065.pdf
- Simões, S.L.G.R.S. (2011). *Prevalência de Infecção numa População de Hemodialisados, em Ambiente Clínico*. (Dissertação de Mestrado). Universidade Nova de Lisboa, Faculdade de Ciências Médicas Universidade Atlântica. Acedido em <https://repositorio-cientifico.uatlantica.pt/bitstream/10884/1053/1/Sim%C3%B5es%20Sara%20TM%202013.pdf>
- Sociedade Portuguesa de Nefrologia (2017). *Encontro renal 2017*. Acedido em <https://www.portaldodialise.com/articles/encontro-renal-2017>
- Sorensen, K. (2012). *Health literacy and public health: A systematic review and integration of definitions and models*.
- Sorensen, K., Van den Broucke, S., Fullam, J., Doyle, G., Pelikan, J.M., Slonska, & Helmut, Z.B. (2012). Health literacy and public health: A systematic review and integration of definitions and models. *BMC Public Health*, 12, 80. doi: 10.1186/1471-2458-12-80. Acedido em <https://www.ncbi.nlm.nih.gov/pubmed/22276600>

- Sousa, M. (2012). *Adesão ao tratamento medicamentoso da pessoa portadora de insuficiência renal crónica em hemodiálise*. (Dissertação de Mestrado). Instituto Politécnico de Viseu, Escola Superior de Saúde de Viseu. Acedido em <http://repositorio.ipv.pt/handle/10400.19/1681>
- UNESCO (2009). *Education/Literacy*. Acedido em www.unesco.org/en/literacy.

Question Analysis For An Intelligent Tutoring System

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Abstract

This paper presents a syntactic paradigm resulted from question analysis. The result is to be implemented in an intelligent tutoring system designed for the learners who search for computer technology related information. The paradigm is twofold: 1) a set of augmented predicate argument structure (APAS) frames describing the structures of English sentences forming a question, and 2) the classification of sentence types of answers. The set of APAS frames was initially created based on dependency parsing outputs, focusing on verbs and adjectives and their arguments. It was then complemented by adding another argument, a WH-word included in a corresponding question. WH-words play a crucial role in not only completing a PAS frame, but also fetching appropriate answers from web documents. In addition, some sentence types of answers were found to be mapped to a particular WH-word type from questions. Those types were classified according to their corresponding WH-word. Implementing the resultant paradigm is expected to improve the performance of a tutoring system by providing more suitable answers to the given question.

Keywords: *Intelligent tutoring system, question answering, remote learning, answer patterns, augmented predicate argument structure*

Introduction

Computer assisted learning or e-learning is ubiquitous since various Intelligent Tutoring Systems (ITS) are available to learners anytime and anywhere as long as there is an internet access. ITSs also provide an individual atmosphere for the learners as if they have one-to-one interaction with a private tutor, by which learning quality is naturally expected to increase. Those systems usually represent expertise in specific domains, which guarantees a better performance of the systems. Replacing traditional education methods with such systems involves information and communication technologies. In particular, implementing artificial intelligence techniques such as natural language processing is critical to improve the performance of the applications which use human language as a communication tool or the target of learning itself. Question answering (QA) based systems in particular are widely used as an ITS since such systems support learners' needs by providing only the requested information as well as utilizing human language as a medium to answer the questions. The main task of a question answering system is to automatically find answers to the given questions addressed in a natural language. Question answering can be implemented by adopting one of the two major approaches, information retrieval (IR) based and knowledge-based. The IR-based approach works on the questions to determine the types of answers and to retrieve plausibly relevant passages or documents containing the strings contained in a learner's question. The knowledge-based approach utilizes semantic representations which are frequently mapped to some forms of predicate calculus. It converts learner's queries to a presentations denoting semantic information such as times, locations, entities and numeric quantities. In order to draw satisfying performance of a system, both approaches cannot avoid utilizing linguistics resources which trigger to extract best understanding of the questions. Some of the most commonly adopted linguistic resources list part-of-speech tagging, names entity recognition, parsing, semantic relations and so on. Recently, predicate argument structure (PAS) frames have become popular in building an application utilizing natural language processing techniques. They not only represent the syntactic structure of the questions, but also triggers semantic roles labeling. This research suggests a set of augmented PASs (APAS) to be implemented in an ITS which is designed utilizing a knowledge-based QA approach. The APAS frames are extracted from dependency trees focusing on identifying predicate-argument structures (PAS) of learner's questions relevant to computer technology. Since the APASs are customized not only to a QA mode, but also a specific domain, they are expected to contribute to improving the performance of the system.

Related Studies

An Intelligent Tutoring System aims to improve the effectiveness of tutorials and to boost learners' motivation and confidence. There are three main usages of intelligent tutoring (Brusilovsky and Peylo, 2003). Firstly, it can give students detailed feedback on incomplete or erroneous solutions, helping them learn from their mistakes (Intelligent solution analysis). Secondly, it involves intelligent assistance to help learners reach a solution. This approach adopts the constructivist style of teaching, as used by human tutors, to prompt learners to construct their

own knowledge and to encourage a deeper understanding of a topic (Problem solving support). Lastly it adapts tutoring to deliver learning material in a sequence and style best suited to an individual's needs (Curriculum sequencing). This research adopts the combination of the second and the third approaches since our interests lie on an ITS which is implemented based on a question and answering system.

An ITS is a complex computer system that deals with various heterogeneous types of knowledge, ranging from domain to pedagogical knowledge. The skills needed to implement an ITS are artificial intelligence, machine learning, the cognitive sciences, education, human-computer interaction and software engineering. Researches on ITSs have investigated how to make computer-based tutors more flexible, autonomous and adaptive to the needs of each learner. Those systems are endowed with explicit knowledge of the relevant components of the teaching process and with reasoning capabilities to turn this knowledge into intelligent behavior. There are three types of knowledge that an intelligent tutor (human or artificial) needs to aid student learning: 1) knowledge on the target instructional domain, 2) knowledge on the learner, and 3) knowledge on the relevant pedagogical strategies (Conati, 2009).

ITS researches have successfully delivered the techniques and the systems that provide adaptive learner supports for problem solving or question-answering activities in various domains including programming, physics, algebra, geometry, SQL and introductory computer science (Conati, 2009). Some of the systems are actively used in real-world settings, and have even contributed to changing traditional school curricula (Koedinger et al., 1995).

Question Answering (QA) is the task of automatically providing an answer to a question addressed by a human learner in natural language (Bouziane et al., 2015). QA tasks can be classified into three major ones: 1) Question Analysis, 2) Document Retrieval, and 3) Answer Extraction (Lopez et al., 2011).

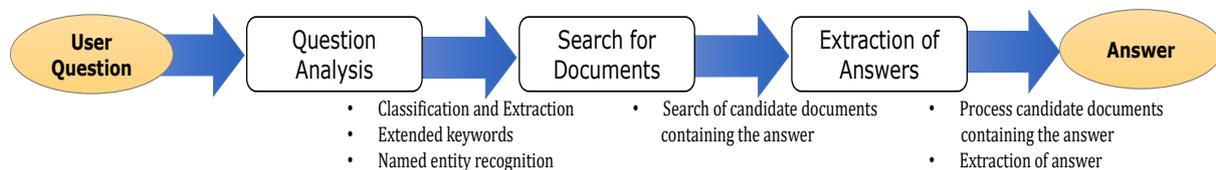


Figure 1. Process of QA system (Lopez et al., 2011)

Figure 1 illustrates the three major tasks which QA process requires. Most question answering systems implement these three steps of the process as base modules.

There are two main modern paradigms for question answering (Jurafsky, D. & Martin, J.H, 2017). The first paradigm is called IR-based question answering or sometimes corpus-based question answering. It utilizes enormous amounts of information available as text on the Web. Given a learner question, information retrieval techniques extract plausible passages directly from these documents, relying on the text of the question. The second paradigm is known as knowledge-based question answering and activated by building a semantic representation of a query. The meaning of the query is usually converted to a full predicate calculus statement. There is no reason to limit QA systems to just corpus-based or knowledge-based approach. IBM Watson system (Ferrucci, 2012) that won the Jeopardy! challenge in 2011 is a model example of QA systems that rely on a wide range of various resources to provide answers to a given question. This research focuses on the mixture of both knowledge-based and IR-based approaches in order to enhance the accuracy in finding correct answers and to provide learners with more useful information than the systems performing similar tasks.

QA systems in general are built by implementing a sequence of process steps which are described as follows (Allam and Haggag, 2012):

1. A question is typed into a QA system by a learner.
2. The core meaning of the question is identified by the question analyzer in order to improve the accuracy of the QA system.
3. Classifying the questions influences the performance of the QA system. The questions are categorized depending on the question type and the type of the expected answer.
4. The question is reformulated through rephrasing it. The query is expanded and passed to the information retrieval system.
5. The information retrieval component is used to extract plausibly relevant documents based on important keywords included in the question.
6. The extracted documents are filtered and shortened into a set of paragraphs that are expected to contain the answer.
7. The filtered paragraphs are arranged by order and passed to the answer processing module.
8. A set of candidate answers is identified according to the answer type and other recognition techniques.
9. A set of heuristics is defined in order to detect a word or phrase directly relevant to answering the question.
10. Finally, the extracted answer is validated for its accuracy and then provided to the learner.

Understanding an event at a high level refers to being able to provide an answer to a given question, such as “who did what to whom” and perhaps also “when and where” (Jurafsky, D. & Martin, J.H, 2017). Answers to the question may be addressed utilizing various sentence structures. A set of PAS frames can be one of the solutions to represent various sentences with the same meaning into the same manner. A predicate, usually a verb, requires a set of arguments that play certain roles. These roles can both represent general semantic properties of the arguments and express their likely relation of the predicate with its arguments in the sentence (Jurafsky, D. & Martin, J.H, 2017). These syntactic relations trigger to identify semantic roles which express abstract roles played by the predicate and its arguments in an event.

Recently, research attention has turned to creating corpora annotated with an argument structure for a broader range of predicates. These researches list the Propbank project at the University of Pennsylvania (Kingsbury and Palmer, 2002) and the FrameNet project at the International Computer Science Institute (Baker et al., 1998). They share the goal of documenting the syntactic realization of the arguments of a set of predicates for general English lexicon by annotating a corpus with semantic roles. In addition, Information Extraction (IE) can take advantage of PASs as IE tries to provide the event-level indexing into news stories and television sources (Surdeanu et al., 2003). PASs can be used as the core event presentation of the input sentence. PASs can be extracted from parsing outputs. Dependency parse trees in particular provide semantic relations of subject and object. PAS frames can be extracted by utilizing several different parsers, which results in more accurate semantic relations for each verb (Krestel, Witte & Bergler, 2010). This research extract a set of PAS frames from dependency parse trees, and augment the set by adding more information to improve the effectiveness of the QA system.

Predicate Argumet Structures

Predicate argument structure is a mechanism to encode syntactic relations among the constituents of a sentence. The PAS of a sentence specifies a head of the sentence, usually a verb and the set of its arguments which are the obligatory constituents for the sentence to be syntactically grammatical. This notion can be mapped to subject-predicate-object structure suggested by a traditional grammar framework. PAS is known as one of the most compact frames to describe a sentence structure even though adjuncts comprise important parts of the sentence since they convey the meaning left out by the arguments.

Predicate argument structure also provides an interface between semantic and syntactic information of a sentence. On the semantic perspective, it describes the event structure by specifying core participants in an event denoted by the predicate. Syntactic information, on the other hand, includes subcategorization of valence of the predicator which provides the number and the type of the arguments. Figure 2 below presents a dependency tree produced by Stanford Parser (Klein and Manning, 2003a & 2003b) and the PAS extracted from the tree.

<p>Q: How can we <u>catch</u> all kind of exceptions in a single catch block ?</p> <p>A: To handle all exceptions, use Exception class.</p>	
Dependency Tree	PAS
	<pre>(catch : nsubj (we) : dobj (all kind of exceptions))</pre>

Figure 2. PAS for ‘catch’

The PAS in Figure 2 displays arguments, *nusbj* and *dobj* required by the verb ‘catch’. The core of the question, however, is delivered by WH word, ‘how’ annotated as *advmod* which is supposed to be mapped to an adjunct and never considered as an argument. If only the PAS of a question is referred to retrieve answers, it is very likely to fail to find requested answers, which eventually decreases the performance of the system.

<p>Q: <u>Why</u> do we use MySQL database server?</p> <p>A: The MySQL database server is very fast , reliable and easy to use.</p>	
Dependency Tree	PAS

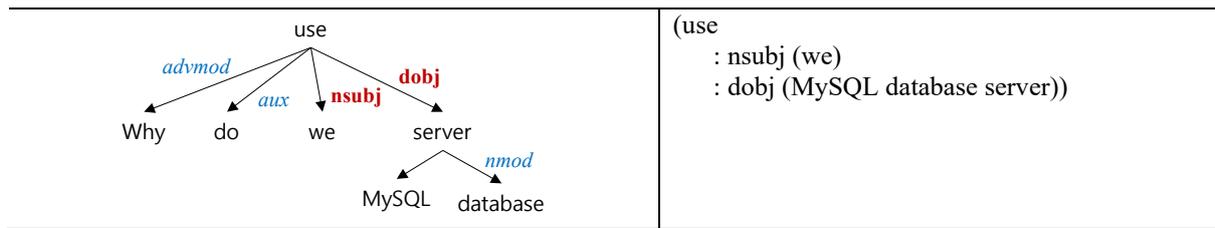


Figure 3. PAS for ‘catch’

Figure 3 presents the PAS of a sentence whose type is identified as WH question led by ‘why’, the core of the question. In the PAS, however, the WH word does not appear since it is not an argument of the verb “use”. Similarly, ‘when’ and ‘where’ are often identified as an adjunct which is also annotated as *advmod* in the dependency parse tree.

Although the predicate and its arguments function as core constituents of a sentence, they cannot represent the full-fledged sentence structure by themselves as shown in Figure 2 and 3. Examining all the adjuncts of a sentence, however, does not seem efficient especially when dealing with domain-specific data which are usually created using a limited number of sentence structures. This research suggests a set of augmented PAS frames to better describe the domain-specific data to be processed in a QA based ITS system.

Question Analysis

Questions and their corresponding answer sentences are collected from Community Question Answering (CQA) services and stored as a QA database. The topics of questions represent mainly computer technology related domains which are most popular in the CQA site.

Sub-domain	Number of QA Pairs
C/C++/C#/Java Programming languages	885
Other Programming languages	1,155
Database	700
Web related	1,217
JavaTech	880
etc.	1,482
TOTAL	6,319

Table 1. Distribution of QA pairs

The distribution of the data shows six types of sub-domains as presented in Table 1. The types of sub-domains include various Programming languages, Database, Web related, JavaTech, and the collection of miscellaneous topics. Programming languages include C/C++/C#, Java, and other languages, which takes up to 30% of the data. Web related questions are the second most popular topic. The total of 6,319 question and answer pairs has been extracted from the data. Question and answer pairs are usually one-to-one mapping in terms of the number of answers per question, but some questions are mapped to a set of answers in which the 19 sentences are found to be the answers to a single question.

The first step to store the QA pairs in the database is to classify the types of question sentences since the questions are addressed utilizing various grammatical mood. The major classes of the resultant classification list interrogative, imperative, and declarative. The rest of the questions are expressed in the form of various fragments including phrases and various types of incomplete sentences such as solely used subordinate clauses. These are excluded in specifying the distribution due to their low frequencies.

Interrogative mood is the most prominent sentence type, followed by an imperative sentence. The least number of sentences is recognized as a declarative sentence. An interrogative sentence is further categorized into two subtypes, WH question and Yes/No question whose answer types are distinctive in their structures. WH question sentences are constructed adopting seven WH words including ‘what’, ‘how’, ‘which’, ‘when’, ‘where’, ‘who’ and ‘why’. Most of the questions are addressed in a full-fledged sentence, and some are composed in a clausal complement.

- 1) How does bitwise operator XOR works?
- 2) How to declare a property in a class?
- 3) Explain the purpose of the keyword volatile.
- 4) If server gets shut down then data stored in Memcached is still available?
- 5) Is FILE a built-in data type?

Example question 1) is addressed in a complete WH question structure whereas example 2) presents a clausal complement where the subject of the sentence is not overtly specified. Question 3) presents imperative mood by

which a request is conveyed. Declarative is the sentence mood in example 4) and it requires the period as its proper punctuation. However, the learners frequently utilize declarative mood to express a question by replacing the period with the question mark.

The next step involves classifying each type into its subclasses. Interrogative sentences are initially divided into WH question and Yes/No question. The former is categorized further according to a WH word included in the sentences. All of seven WH words are used to form an interrogative sentence, and they function as a keyword to extract the requested information as an answer. Yes/No questions are constructed utilizing an auxiliary such as ‘be’, ‘can’ and ‘do’ as presented in example 5). Naturally, the answer to the question is either ‘yes’ or ‘no’ which can be expressed with other negation words. Imperative sentences are formed utilizing a set of verbs which list 14 different verbs such as ‘explain’, ‘tell’, ‘define’, ‘give’, ‘list’, and so on to request an answer to the question. Unlike the interrogatives, the exclamation mark is either replaced with the period or simply deleted as shown in example sentence 3).

Question Sentence Type		Distribution	Keyword
Interrogative	WH question	87.0% (5,500)	what (3724) how(1091) which (476) why (90) when (78) where (23) who (18)
	Yes/No question	6.16% (389)	can (155) be (133) do (96) would /will (5)
Imperative		6.25% (395)	explain (240) name (41) define (32) write (30) give (17) list (12) etc. (23)
Declarative		0.5% (35)	

Table 2. Data Distribution

Table 2 summarizes the subclassification of the data. WH-question is overwhelming majority, 87% of the questions presented in a complete sentence. Among the WH words, ‘what’ is most frequently selected to address a question. The usage of another WH word ‘which’ is similar to that of ‘what’, but its appearance is much less frequent although it is also used as a modifier of a noun. Imperative sentences are the second most frequently occurring mood type as they replace interrogatives, utilizing a set of verbs as listed in Table 2. Learners seem to prefer addressing a question in an imperative sentence since it is constructed with a simpler structure than an interrogative and accordingly saves some typing efforts.

When database construction is completed, question sentences are parsed using Stanford Parser which produced both phrase structure trees and dependencies. Figure 4 displays the process outline to be implemented in a system.

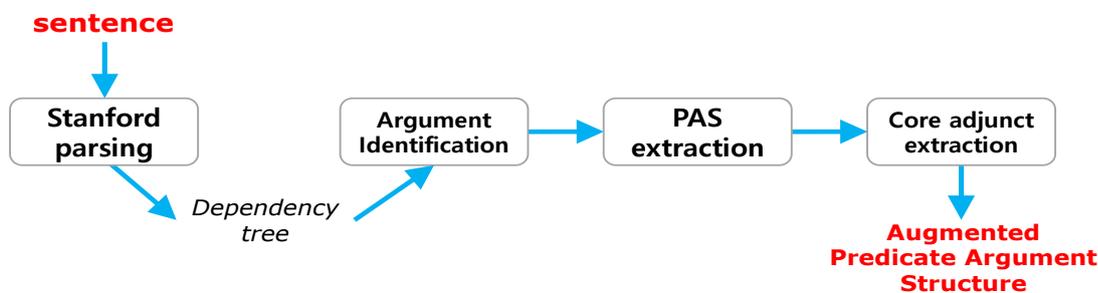


Figure 4. Process of Extracting APAS

This research has chosen dependency parse trees over phrase structure (PS) trees since they represent the relations among the constituents and their associated predicates. Dependency trees are derived by applying dependency grammar rules and simpler in hierarchy than the PS trees. The trees describe the structure of a sentence utilizing actual words included in the sentence rather than adopting an abstract symbol to label the nodes in the trees. The words are represented with directed grammatical relations held among themselves, from which the arguments of the predicator can be identified.

PA structures have been extracted from dependency parse trees by examining resultant annotations and mapping them to the arguments of the sentence. Since the canonical PAS does not provide enough information to find appropriate answers as explained with Figure 1 and Figure 2, core adjuncts used for more specifically describing sentence structures are identified and added to the PAS. Since WH question sentences are the majority type of the data and some of the WH words are parsed as an adjunct, properly identifying the roles of WH words is expected to enhance the system performance in finding answers.

This research focuses on analyzing WH words which do not occur as an argument, but an adjunct in general. Those include ‘how’, ‘why’, ‘when’, ‘where’, and ‘why’. They are added to a PAS frame according to their role, either a core adjunct or an argument that is missing from the frame. The rest three, ‘what’ who’ and ‘which’ are considered as an argument which appears in existing PAS frames although ‘which’ as a modifier is ignored. This

resultant augmented PAS presents not only the arguments of the predicate, but also a WH word as an additional argument which plays a key function to describe the structure of the question sentence.

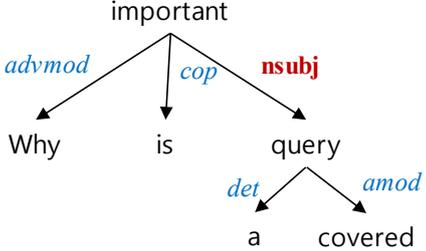
<p>Q: Why is a covered query important? A: Since all the fields are covered in the index itself, MongoDB can match the query condition as well as return the result fields using the same index without looking inside the documents.</p>	
Dependency Tree	APAS
 <pre> graph TD important[important] -- cop --> is[is] important -- advmod --> Why[Why] important -- nsubj --> query[query] query -- det --> a[a] query -- amod --> covered[covered] </pre>	<pre> (important : nsubj (a covered query) : why ()) </pre>

Figure 5. APAS for ‘important’

A sole canonical argument of the question is identified as *nsubj* to the predicate, ‘important’ in Figure 5. Compared to a PAS such the frame in Figure 3, a WH word, ‘why’ is recognized as an argument conveying the requested information expressed in the question. When it is included in APAS, the lemma, *why* replaces the dependency annotation *advmod* as the core adjunct which is crucial to find relevant answers.

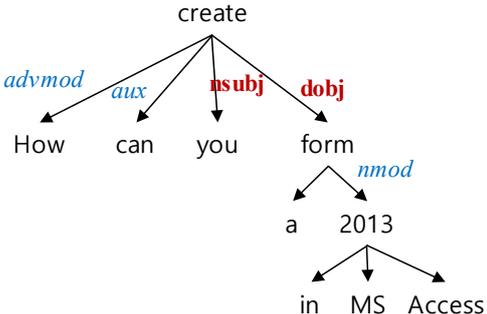
<p>Q: How can you create a form in MS Access 2013? A: Here are a lot of methods for creating forms but with Form Wizard method, you can always modify the form later using Design View.</p>	
Dependency Tree	APAS
 <pre> graph TD create[create] -- aux --> can[can] create -- advmod --> How[How] create -- nsubj --> you[you] create -- dobj --> form[form] form -- nmod --> a[a] form -- nmod --> 2013[2013] 2013 --> in[in] 2013 --> MS[MS] 2013 --> Access[Access] </pre>	<pre> (create : nsubj (you) : dobj (a form in MS Access 2013) : how ()) </pre>

Figure 6. APAS for ‘create’

Another WH word, ‘how’ in Figure 6 triggers the requested information necessary to create a form in an application, MS Access. Although the sentence is considered syntactically grammatical with its PAS frame containing all the arguments identified, correct answers cannot be retrieved without interpreting ‘how’, the core adjunct. It specifies the core of the question, the manner by which a form is created. Its annotation in the dependency parse tree is also *advmod* identical to that of ‘why’, which is substituted with its lemma filling an argument slot to complete the APAS frame for ‘create’.

<p>Q: In how many ways you can pass parameters to a method? A: There are three ways that parameters can be passed to a method – Value parameters – This method copies the actual value of an argument into the formal parameter of the function.</p>	
Dependency Tree	APAS

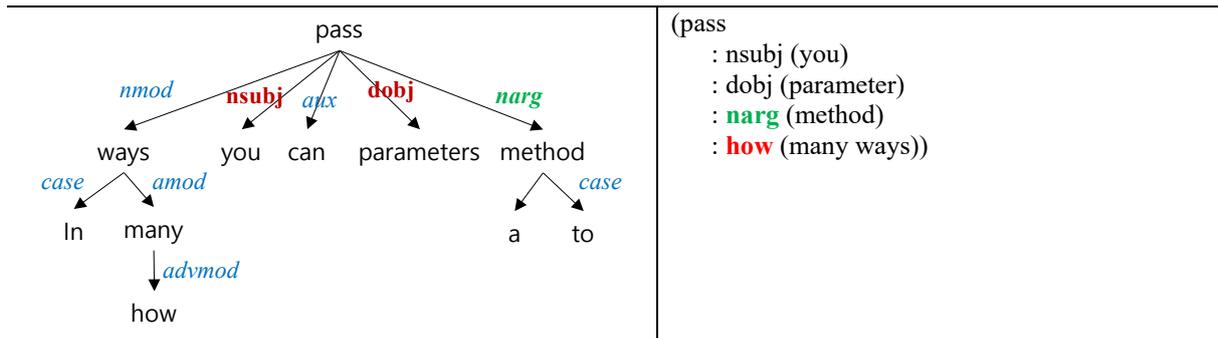


Figure 7. APAS for ‘pass’

Stanford parser sometimes parses an argument as an adjunct because it does not consider subcategorization information carefully. The verb ‘pass’ requires three arguments to be both syntactically and semantically grammatical when it has to be interpreted as a particular sense as in Figure 7. This study suggests an augmented PAS frame in which the missing argument, *narg* is correctly recovered. Another argument added to the frame is a WH word ‘how’ which functions as a specifier to an NP ‘many ways’, but it plays a key role to find appropriate answers to the question. As a result, the system can properly retrieve the requested information.

Q: How to sort an array in C#?
A: Using Array.sort(array) function.

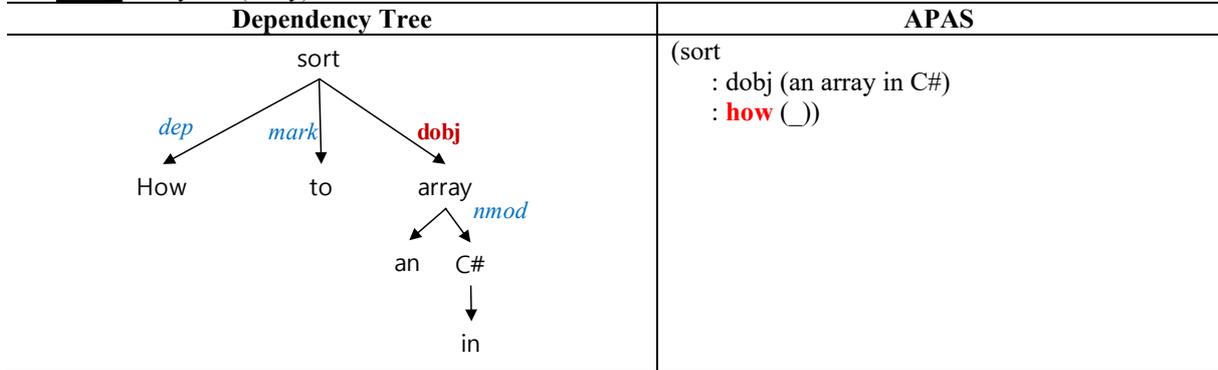


Figure 8. APAS for ‘sort’

Figure 8 presents a question constructed in an incomplete sentence, a clause which functions as a complement. This clause is initially parsed to identify the head and its arguments. A single argument is identified as *dobj* to the predicate, ‘sort’. What the learner has inquired is the manner of sorting an array, which is represented using a WH word ‘how’. This research identifies ‘how’ as a core adjunct and adds it to the PAS frame of ‘sort’. Although ‘how’ in the parse tree is annotated as *dep* which does not represent an overt dependency, the APAS frame lists it as *how*, by which a QA system benefits from the ASPA to find appropriate answers.

Q: When should exploratory testing be performed?
A: Exploratory testing is performed as a final check before the software is released.

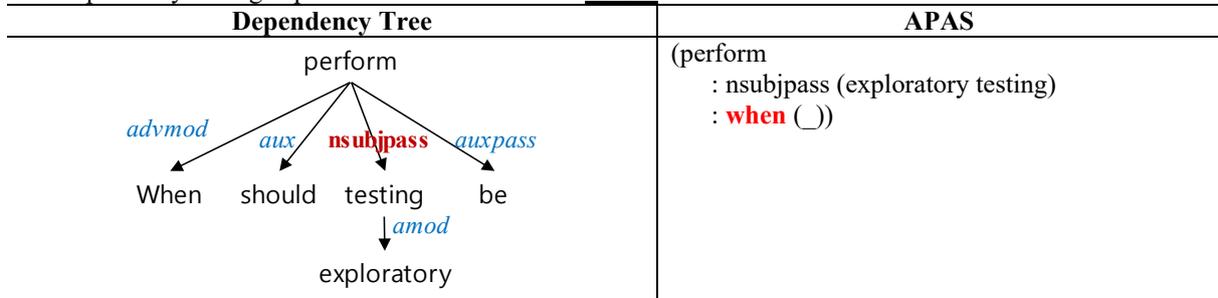


Figure 9. APAS for ‘perform’

The predicate of the question, ‘perform’ in Figure 9 does not require a time expression to satisfy grammaticality. A WH adverb ‘when’ is parsed as an adjunct annotated as *advmod* which is excluded from a canonical PAS frame. Without recognizing the WH-word, the system cannot provide the answers that the learners have expected. The augmented PAS frame now includes *when* as a required constituent to satisfy the need of the learners.

<p>Q: Where is an automatic variable stored?</p> <p>A: Every local variable by default being an auto variable is stored in stack memory.</p>	
<p>Dependency Tree</p>	<p>APAS</p> <pre>(store : nsubjpass (an automatic variable) : where ())</pre>

Figure 10. APAS for ‘store’

Another WH adverb ‘where’ in Figure 10 is also parsed as *advmod*. Unlike the predicate in Figure 9, the verb ‘store’ requires an adverbial phrase referring to a location along with direct object tagged as *dobj* to be syntactically correct although *dobj* is missing from the frame since the voice of the question is passive. Adding *where* to the PAS frame not only satisfies subcategorization constraints of the predicate, but also provides a crucial clue to find the requested information.

Conclusion

This research has suggested a set of augmented predicate argument structures customized for an Intelligent Tutoring System which deals with domain-specific data. The system is designed to answer to a question related to computer technology domain. The total of 6,319 Question-Answer pairs has been collected and analyzed. The types of question sentences were initially classified as interrogative, imperative and declarative followed by subclassification of the interrogatives into WH-question and Yes/No question. These sentences are analyzed to identify their syntactic structures utilizing dependency parsing and predicate argument structures. An initial PAS frame has been extracted from the dependency parse tree produced by Stanford parser. The resultant set of PAS frames has been examined and augmented to complement missing information. Since the PAS frames often did not contain required information, they were augmented by recovering missing arguments according to subcategorization of the predicate and identifying core adjuncts which are not arguments but necessary constituents to detect the requested answers. While working on analyzing the data, a set of keywords have been detected to find appropriate answers. For example, a question formed using ‘how’ is usually mapped to sentences with a set of keywords or a particular sentence type. Answers are usually delivered in a declarative sentence containing “by verb+ing” or “to infinitive”. Another sentence type is imperative which begins with a verb or ‘you’ presenting emphasized imperative. Identifying such information from the answers is also expected to improve the accuracy of finding answers.

The next step of the research will be implementing the augmented PAS frames in a QA based intelligent tutoring system. Since the frames are customized for correctly analyzing the structure of question sentences, it is expected to enhance the system performance of the system. Furthermore, the APAS framed with minor revision can be used in similar type of question-answering based tutoring systems which deals with the data of similar domains.

References

- Allam, A. M. A. & Haggag, M. H. (2012). “The Question Answering Systems: A Survey.” *International Journal of Research and Reviews in Information Sciences (IJRRIS)* Vol. 2, No. 3.
- Brill E., Dumais S. & Banko, M. (2002). “An Analysis of the AskMSR Question-Answering System”, In *Proceedings of 2002 Conference on Empirical Methods in Natural Language Processing (EMNLP)*.
- Bouziane, A., Bouchiha, D., Doumi, N. & Malki, M. (2015). “Question Answering Systems: Survey and Trends,” *The International Conference on Advanced Wireless, Information, and Communication Technologies*
- Brusilovsky, P. & Peylo, C. (2003). Adaptive and Intelligent Web-based Educational Systems. *Int. J. Artificial Intelligence in Education* 13, pp. 156—169
- Collin F. Baker, Charles J. Fillmore, & John B. Lowe. (1998). The Berkeley FrameNet project. In *Proceedings of COLING/ACL*, p86-90, Montreal, Canada.
- Conati, C. (2009). “Intelligent Tutoring Systems: New Challenges and Directions,” Conference: IJCAI 2009, *Proceedings of the 21st International Joint Conference on Artificial Intelligence*, Pasadena, California, USA, July 11-17.
- Dong, T., Furbach, U., Glöckner, I. & Pelzer, B. (2011). A Natural Language Question Answering System as a Participant in Human Q&A Portals. In: *22nd International Joint conference on Artificial Intelligence*.
- Ferrucci, D. A. (2012). Introduction to “This is Watson”. *IBM Journal of Research and Development*, 56(3/4),

1:1–1:15

- Jurafsky, D. & Martin, J. (2017). Speech and Language Processing. Draft of August 7, 2017.
- Kingsbury, P. & Palmer, M. (2002). From Treebank to PropBank. In *Proceedings of the 3rd International Conference on Language Resources and Evaluation (LREC-2002)*, Las Palmas, Canary Islands, Spain.
- Klein, D. & Manning, C. D. (2003a). Accurate unlexicalized parsing. In *ACL '03: Proceedings of the 41st Annual Meeting on Association for Computational Linguistics*, pp. 423–430, Morristown, NJ, USA. Association for Computational Linguistics.
- Klein, D. & Manning, C. D. (2003b). Fast exact inference with a factored model for natural language parsing. In *Advances in Neural Information Processing Systems*, volume 15. MIT Press.
- Koedinger, K. R., Anderson, J. R., Hadley, W. H., & Mark, M. A. (1995). *Intelligent tutoring goes to school in the big city. International Journal of Artificial Intelligence in Education* (1997), 8, pp. 30-43
- Krestel, R., Witte, R. & Bergler, S. (2010) “Predicate-argument extractor (pax).” *New Challenges For NLP Frameworks Programme*, pp. 51-54.
- Lopez, V., Uren, V., Sabou, M. & Motta, E. (2011). “Is Question Answering fit for the Semantic Web?: a Survey”. Universität Bielefeld, Germany
- Rus, V. & Graesser, A. C. (2006). Deeper Natural Language Processing for Evaluating Student Answers in Intelligent Tutoring Systems, *Proceedings of the Twenty-First National Conference on Evaluating Student Answers in Intelligent Tutoring System*.
- Surdeanu, M., Harabagiu, S., Williams, J. & Aarseth, P. (2003). “Using Predicate-Argument Structures for Information Extraction,” *Proceeding ACL '03 Proceedings of the 41st Annual Meeting on Association for Computational Linguistics - Volume 1*, pp. 8-15.

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Reasoning In Mathematics And Accounting Courses: A Sample Of Social Science Department Of The Vocational School*

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Abstract

The role of participants' logical reasoning in learning math and accounting has transferred to educational study area recently (Durand-Guerrier, 2003; Selden & Selden, 2003) creative reasoning thinking is using motive to think. We give here on an analysis of the organizations for creative reasoning applied to vocational school participants. This study uses the model developed by Lithner (2008) that distinguishes between derivative reasoning that is connected to rote education and imitation of algorithmic operation and inspired reasoning that includes reasonable math created opinions. The analysis includes the investigation of notes, assignments and examinations applied in basic math and accounting lecture in social science department of Niğde Ömer Halisdemir Social Science Vocational School with the opinion to organizing the kinds of reasoning anticipated of the participants. Moreover, explaining our use of Lithner's method, we discuss its suitability as an instrument for organizing reasoning occasions in social science department's math and accounting lecture (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008).

Keywords: vocational school, math reasoning, social science department

Introduction

Instructive applications of the power of activating practical reasoning on participants' skills in math showing didn't yield solid wanted profits (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008; Harel, G., & Sowder, L. (1998).; Harel, G., & Sowder, L. 1998; Durand-Guerrier, 2003; Şeneldir at all., 2017a; Kılıçaslan at all., 2018). Lithner (2008) defines reasoning as '*the line of thought adopted to produce assertions and reach conclusions in task (problem)-solving*'. This explanation has both high and low-level advices and is not limited to verifications of propositions. The context is useful in learning the thinking procedures desired to solve problems in basic math and accounting lecture, that proofs aren't given but participants are anticipated to make reasonable influences and decisions. Lithner categorizes between imitative reasoning that is linked to rote education and imitation of procedures and creative reasoning that includes practical math-shown opinions (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008). In this study, it is used this context to categorize the reasoning occasions obtainable in a variety of business math offered in Niğde Ömer Halisdemir Social Science Vocational School. We are considering both lecture for specialist and non-specialist participants, as well as compulsory and non-compulsory components in this program.

According the education researchers, transition from high school (or college) to university is widely recognized as a difficult procedure and participants usually think that the move in math and accounting lectures (physic and chemistry) is usually difficult and problematic (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008; Of at all, 2018; Kahraman at all, 2018; Şeneldir at all., 2017; Boesen and Lithner, 2010). Participants' difficulties in first year coming from notional approach rather than concrete presentation of math teacher (Harel, G., & Sowder, L. 1998.; Koparan At All, 2018; Fucawa-Connolly, 2005). Participants' difficulties are specially with the notions as complex numbers, special function, derivate, derivative, and deeply analyzing of definition of these notion and the long and abstract proofs (Görentaş and Yıldız, 1999; Bilgin at all, 2010; Yıldız and Görentaş; Bilgin and Görentaş, 2008). These basic notions of university math are also widely used from the participants including the department such as engineering, physic, biology, some social programs. It is a recognized and accepted math reaty that the study of math be powerful step by step with the progress of abstract thinking skills, and the one of the basic purposes of math education is to teach math reasoning (Hourigan, M. & O'Donoghue, J. 2007; Jacques, I. 2009; Lithner, J. 2008; Lyons, M., Lynch, K., Close, S., Sheerin, E. & Boland, S. 2003; Harel, G., & Sowder, L. 1998; Harel, G., & Sowder, L. 1998; Şeneldir at all, 2017c; Clark and Lovric, 2009). Diagnosing that participants' use of reasonable insinuations is fundamental to the verifying. This study aims to analyse how logic instructions with an obvious stress on concrete examples might support participants advance the reasoning of reasonable insinuations and skill in math activity (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008; Battal at all., 2017; Bostan, and Durmuş, 2016; Bostan, and Durmuş, 2017; Durmuş, 2016).

Framework of the study

Math proofs are crops of math evidencing. Moreover, we use the concept "math proving" in this study had used with proof creations (Of at all, 2017; Tola at all, 2017; Harel & Sowder, 1998; Weber, 2001). To categorize the other proof-related skills that we explain in the next 5 sections, proof information. These two other skills had been planned as vital for participants' proof and proving (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008; Alcock & Weber, 2005; Selden & Selden, 2003).

In this study some kind of questions will be participants' labor material counting work problems. Lithner (2008) clarified differences between imitative and creative reasoning. Imitative reasoning has two basic forms: "memorised and algorithmic". In order to be modulated as memorised a reasoning procedure should have complicated the following point (Bhaird, C., Nolan, B., O'shea, A., & Pfeiffer, K. 2008; Lithner 2008):

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- i. "the tactic choice is examined on concentrating a complete answer"
- ii. "the tactic application wants to have only the registering"

This kind of reasoning is perceived most often at the vocational school level when participants are requested to express a math explanation, to express an axiom and a proof of specific algorithm. Lithner (2008) calls a reasoning activity as creative if it has the following 3 fonts (Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008):

- i. "novelty. A new reasoning sequence is applied"
- ii. "plausibility. Applying of arguments is necessary to support strategy implementation. It motivates participants to think that the conclusions are true or not"
- iii. "math toleration. Background level of participant's determinate the accomplishment of the strategies"

In this point, he also added that the creative reasoning organization can be additional separated into two subgroups (DREYFUS, 1991): "local creative reasoning"; and "global creative reasoning" (Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008). A" problem set is recognized "need local creative reasoning" if it is resolvable expending any algorithm but the it wants to be modified by the algorithm locally". "a problem set is recognized "need global creative reasoning" if it doesn't have a solution that is built on any algorithm and requires creative reasoning" (Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Method

In this study, we used model questions from mathematics and accounting lecture of social science department of the vocational school. The lectures include four business math modules. These four modules are created from the math and accounting lecture offered to participants. The data in this study involve of the next type models: lecture notes, math books, assignments, examination questions. We got all the information with the collaboration of the module lecturers. The data analysing of each module is being showed by the author of this article (Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

This research method confirms consistency of the analysis of the lecture material from the different units. We first made the analysis by categorizing exercises from math book, to increase some practice and to argue and decide on our organization approaches. The processes are the same way with the offered by Lithner (2008) and Norqwist, (2016). Lithner build a solution to the papers and associated to the lecture notes and math book samples. By means of Lithner's context, we focus the questions that the papers would be answered by algorithmic reasoning or creative reasoning is required. We showed that the challenging choices connected to the organization of questions to the local creative reasoning or global creative reasoning categories, and so we set the framework as the way that: we first define that we would classify a problem as local creative reasoning if the local creative reasoning was founded on an algorithm, but participants had to confirm the problem in subgroups. We determined to classify a problem as global creative reasoning if two or more parts were necessary (Norqwist, 2016; Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Analyses and findings

In this section we will present some examples of questions categorized by the Lithner reasoning framework. We focus on one issue to be comprehensible and to able to relate groups. We think the subject of rational equations, which is important in basic math and accounting lecture. In the lecture in question, the lecture notes and the math book oriented solutions of rational equations expending the quadratic formula and operating and give examples that explain with two methods (Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Question 1: solve the rational equations, write a different format if it is conceivable.

- (a) $x^2 - 13x + 42 = 0$;
- (b) $x^2 - 8x + 2 = 0$;
- (c) $3x^2 - 75 = 0$;
- (d) $x^2 - 18x + 81 = 0$;
- (e) $x^2 + 2x + 2 = 0$;
- (f) $x^2 - 10x + 170 = 14x + 30$.

Some analysis of the question:

In the question, participants are anticipated to use the quadratic formula of the rational equations (norqwist, m. 2016).

- A) $x^2 - 13x + 42 = (x - 6)(x - 7)$, so the solutions are $x = 6, 7$;
- B) by using of the quadratic formulae of the equations, so the final step of the solution is $x = 4 \pm \sqrt{14}$, with the presentation, $x = 7,741$, and $x = 0,26$;
- C) $3x^2 - 75 = 3(x^2 - 25) = 3(x - 5)(x + 5)$, so the solutions are $x = -5, 5$;
- D) $x^2 - 18x + 81 = (x - 9)^2$, so there is just unique solution at $x = 9$.
- E) using the quadratic formula we have $x = -1 \pm \sqrt{-4}$, so there are no real solution;
- F) subtracting $14x + 30$ from both sides gives $x^2 - 24x + 140 = 0$ and since $x^2 - 24x + 140 = (x - 10)(x - 14)$, the solutions are $x = 10, 14$.

Question 2: write the solutions to the next equation:

$$(x - 5)(x + 3)(1 - x) = 0.$$

Analysis of the question:

$$(x - 5)(x + 3)(1 - x) = 0, \text{ we conclude that } x = 5, -3, 1.$$

This question is a creative reasoning model, precisely it is a local creative reasoning task. The participants could use the factor algorithm from the mathematics course documents or the math book. Moreover students want to settle it to the three components (Norqwist, M. 2016; Bhaird, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Analysis of the question:

It is clear that the method in this task is an imitative reasoning work, explicitly it is an algorithmic reasoning study. The participants should to practice the algorithms from the course notes or from the math book suggested by the math teacher in the vocational school (Norqwis, M. 2016; Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Question 3: one solution of the rational equation

$$x^2 - 7x + m = 0$$

Is known to be $x = 3$. Find the other solution.

Analysis of the question:

Since $x = 3$ is a solution, we can see that

$$3^2 - 7 \cdot 3 + m = 0, \text{ then } m = 12.$$

By using of this value, we can solve $x^2 - 7x + 12 = 0$ using the factor model to get that the other solution is $x = 4$.

This approach is a creative reasoning study, especially it is a global creative reasoning situation. We assume that the lecture notes and math book do not enclose this algorithm or example that the participants can apply it to solve this question. Participants must to generate an original logically reasonable tactic to admit the mark of m (Norqwis, M. 2016; Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Result

When logical education in all situations improved participants' creative mode of suggestions, the achievement in math verifying are restricted by the explanations of math presentations (Norqwis, M. 2016). In this study, it used an analysis of the organizations for creative reasoning applied to vocational school participants. The analysis of the questions for the different lecture has not been presented in this study. Thus, we cannot give full conclusion of the proportions of tasks in each group. With this question modification, we have not showed any technique in the commit to memory reasoning classification (Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

The grouping isn't always simple and clear, particularly we decide between local creative reasoning and a global creative reasoning. Similar difficulties arise in distinguishing between algorithmic reasoning and local creative reasoning (Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Categorizations like the question used in this study can help lecturer to be sure they stabile the teaching, tasks and investigations to confirm that participants are offered by an suitable diversity of reasoning study, and to evade an much highlighting on routine-teaching and learning (Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

Finally, we can note that the results of the all analyzing of questions would offer a completed information of the reasoning openings available to accounting department participants of the vocational classes in our lecture. By effective application of this arguments, so we, as researcher, planning to offer a valuable instrument for other math teachers from all different level of school (Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. 2008).

References

- Alcock, L., & Weber, K. (2005). Proof Validation In Real Analysis: Inferring And Checking Warrants. *Journal Of Math Behavior*, 24, 125-134.
- Boesen, J., Lithner, J., & Palm, T. (2010). The Relation Between Types Of Assessment Questions And The Math Reasoning Participants Use. *Educational Studies In Math*, 75, 89-105.
- Battal, F. Durmuş, İ. Ve Çınar, İ. (2017). The Effects Organizational Citizenship Behaviours And Decision-Making Styles On Transformational Leadership Behavior. *International Periodical For The Languages, Literature And History Of Turkish Or Turkic*, 12 (31), Pp. 1-28.
- Bhaired, C., Nolan, B , O'shea, A, & , Pfeiffer, K. (2008). An Analysis Of The Opportunities For Creative Reasoning In Undergraduate Calculus Classes. <https://www.dcu.ie/sites/default/files/smec/pdfs/cmacanbhaired-analysis-of-opportunities-for-creative-reasoning-in-undergraduate-calculus-lecture.pdf>
- Biglin, T. And Görentaş, N. (2008). A Note On Characterization Of $N_u(D_n)$. *International Electronic Journal Of Algebra*, 3, 135-140.
- Biglin, T., Görentaş, N. And Kelebek, I.G. (2010). Characterization Of Torsion Units Of Z_{24} . *Journal Of Korean Math Society*, 6, 1239-1252.
- Bostan, S. Ve Durmuş, İ. (2016). Yöneticilerin Karar Sürecinde Zamanı Kullanması Üzerine Bir Araştırma. *Journal Of Administrative Sciences*, 14 (27), Pp. 277-307.
- Bostan, S. Ve Durmuş, İ. (2017), "An Attemp To Develop A Scale On The Decision Process: The Manager Decision Time Scale", *Hacettepe Sağlık İdaresi Dergisi*, 20 (2), Pp. 125-141.
- Clark, M. & Lovric, M. (2009). Understanding Secondary-Tertiary Transition In Math. *International Journal Of Math Education In Science And Technology*, 40 (6), 755-776.
- Durmuş, İ. (2016). Tv Reklamlarının Tüketicilerin Tutum Ve Motivasyonları Üzerindeki Sosyo-Ekonomik Etkileri: Üniversite Öğrencileri Üzerine Bir Uygulama. *The Journal Of International Scientific Researches*, 1 (1), Pp. 28-40.
- Durand-Guerrier, V. (2003). That Notion Of Implication Is The Right One? From Logical Considerations To A Didactic Perspective. *Educational Studies In Math*, 53, 5-34.
- Dreyfus, T. 1991. *Advanced Math Thinking Processes*, In Tall D. (Ed) *Advanced Math Thinking*. Kluwer Academic Publishers.
- Fukawa-Connelly, T. 2005. Thoughts On Learning Advanced Math. *For The Learning Of Math*, 25, 33-35.
- Görentaş, N. And Yıldız, M. (1999). A Characterization Of Idempotents And Idempotent Generators Of Q_s . *Bulletin Of Pure And Applied Sciences*, 18(2), 289-292.
- Harel, G., & Sowder, L. (1998). Participants' Proof Schemes. In A. H. Schoenfeld, J. Kaput & E. Dubinsky (Eds.), *Research In College Math Education Iii* (Pp. 234 - 283). Providence, R.I.: American Math Society.
- Hourigan, M. & O'Donoghue, J. (2007) Mathematical under-preparedness: the influence of the pre-tertiary mathematics experience on students' ability to make a successful transition to tertiary level mathematics courses in Ireland. *International Journal of Mathematical Education in Science and Technology*, 38 (4), 461-476.

- Jacques, I. (2009). *Mathematics for Economics and Business*, 6th Edition. Prentice Hall, Harlow, England.
- Lithner, J. (2008). A research framework for creative and imitative reasoning. *Educational Studies in Mathematics*, 67, 255-276.
- Lyons, M., Lynch, K., Close, S., Sheerin, E. & Boland, S. (2003). *Inside classrooms: the teaching and learning of mathematics in social context*. IPA: Dublin.
- Kahraman, K., Of, M. And Tola, Y. (2018). Accounting And Task Application Participants' Learning Styles In Distance Education. *The Online Learning Of Distance Education And E-Learning*, 6(2), 16-20.
- Kılıçaslan, I., Aydın, S., Türkeri, K. And Soydaş, H. (2018). Attitudes Towards Online Web Assisted Learning: Accounting And Tax Participants. *The Online Learning Of Distance Education And E-Learning*, 6(2), 27-33.
- Koparan, B., Akça, Ü., Köş Aydın, F. And Aydın, S. (2018). On The Attitudes Of Construction Technology Participants Towards Information And Communication Technology. *The Online Learning Of Distance Education And E-Learning*, 6(2), 67-73.
- Lithner, J. (2008). A Research Framework For Creative And Imitative Reasoning. *Educational Studies In Math*, 67, 255-276.
- Norqvist, M. (2016). On Math Reasoning. [Http://Umu.Diva-Portal.Org/Smash/Get/Diva2:954413/Fulltext01.Pdf?](http://Umu.Diva-Portal.Org/Smash/Get/Diva2:954413/Fulltext01.Pdf?)
- Of M., Şeneldir O., Tola Y., Koparan B., Kahraman K. (2017). Scorm Nesneleri Ile Etkileşimli Eğitim. *Turkish Online Journal Of Educational Technology*, Si, 64-72
- Of, M., Kahraman, K. And Kudu, M. (2018). Computer Programming Participants' Attitudes In Distance Education. *The Online Learning Of Distance Education And E-Learning*, 6(2), 41-45.
- Selden, A., & Selden, J. (2003). Validations Of Proofs Considered As Texts: Can Undergraduates Tell Whether An Argument Proves A Theorem? *Journal For Research In Math Education*, 34(1), 4-36.
- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional And Social Intelligence Against Inertia. *Turkish Online Journal Of Educational Technology*, Si, Pp.229-234.
- Şeneldir, O., Kudu, M. Genel, Y., Akça, Ü., Soydaş, Aydın., S. (2017b). Types Of Behavior In Businesses And Resistance To Individual Change. *Turkish Online Journal Of Educational Technology*, Si, Pp.843-848.
- Şeneldir, O., Aydın, S., Kudu, M., Kılıçaslan, I., Of, M. & Mutlu, C. (2017c). Kaizen And Intuition In Stress Management. *The Turkish Online Journal Of Educational Technology*, Si, Pp. 345-349.
- Tola Y., Aydın S., Şeneldir O., Mutlu C., Koparan B., Of M. (2017). Meslek Yüksekokulu Öğrencilerinin Memnuniyet Düzeyleri Üzerine Bir Araştırma. *Turkish Online Journal Of Educational Technology*, Si, 607-610.
- Weber, K. (2001). Participant Difficulty In Constructing Proofs: The Need For Strategic Information. *Educational Studies In Math*, 48(1), 101 - 119.
- Yıldız, M. And Görentaş, M. (1996). On Homogenous Maps. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 1(2), 14-149.

Reflective Learning In High-Fidelity Simulation Among Undergraduate Nursing Students

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Abstract

This paper was to elaborate and analyze the conceptual framework of reflection, the methods of reflective learning in high-fidelity simulation. The foundation and inherent to the reflective processes are knowledge, skills, attitude, experience and emotion. The reflective practice includes the phases of before action, in action, on action and beyond action. 1) Reflection before the simulation includes the orientation to environment and simulator and reflection on knowledge, skills, attitudes, experiences and emotion. 2) Reflection in action: Students are exposed to the simulated scenario and initially determine what is happening with the patient. 3) Reflection on action involves critical self-analysis of the identification of decision points, and acknowledgement of strength and weakness in both skill performance and reasoning patterns. 4) Reflection beyond action: The reflection beyond action is conducted in post-simulation. It includes reflection on performance and reflection on evidence-based practice. Conclusions: The reflective learning in simulation occurs in the concrete experience, active experimentation (debriefing), reflective observation, and abstract conceptualization. Reflective learning can assist the students to enhance their cognitive abilities, and offer students the opportunity to practice their assessment and organizational skills.

Keywords: *Reflection, learning, high-fidelity simulation, nursing*

Introduction

Nursing is a practice profession and active learning by caring for patients always has been the preferred method of achieving competency. The nursing graduates are expected to have mastery of technology and handle diverse situations while providing empathetic, ethical, and therapeutic care to patients and considering patients' unique psychosocial, generational, and cultural characteristics (Birkhoff, Donner, 2010). Although students may have been taught how to make clinical decisions theoretically, they were not always able to link all of the pieces together, nor could they articulate the thinking processes involved. Limited clinical placement and shortened lengths of stay for patients affect opportunities for clinical experiences with real patient care situations. Such constraints affect a nursing student's ability to develop the necessary clinical competence to care for patients. The linking of theory with practice is best attained through reflective learning, in which students are encouraged to focus on problem solving, critical thinking, and teamwork (Nash, Harvey, 2017) .

Patient simulators provide a very realistic situation. Simulation is designed to encourage active participation in the learning process allowing students to construct knowledge, explore assumptions, and develop psychomotor skills in a safe environment (Jeffries, 2008). High-fidelity simulators use software that allows the physiologic parameters to change in response to interventions. It provides a pedagogical link between education and practice, and provides nursing students with the opportunity to analyze and synthesize patient data in order to review clinical decisions in a supportive and safe environment (Eppich, Cheng, 2015). Skill practice may enhance development of psychomotor skills, but it does not account for other factors that may impede performance for real patients. Simulation cannot replace working with real patients but it does mimic reality, providing an environment to practice skills and rehearse clinical situations, including making clinical decisions, problem solving in the safe way. Simulation allows students to practice in a risk-free environment, where they can develop both cognitive and psychomotor skills, and lets students to be self-directed and discuss clinical scenarios openly. Students can make mistakes and learn from the mistakes in the simulation (Tanner, 2006). While students are taking care of simulated patients with multifaceted issues, they must consider a variety of conflicts and complex factors in choosing the best practice. Using a high-fidelity patient simulator or a simulated clinical experience allows students to practice real-life nursing care in a simulated clinical environment (Yuan, Williams, Fang, 2011).

Most of the health related research involving high-fidelity simulation has been conducted in medical and nursing education with the focus on emergency care, advanced trauma life support, cardiopulmonary resuscitation, mechanical ventilation, or neonatal resuscitation. A number of studies have found simulation to be a valuable tool as a means of assessing and or improving knowledge acquisition and clinical skills. A few studies found simulation is an effective means of improving competence. Conversely, some studies demonstrated no significant improvement in knowledge and skills after simulation and no significant difference in confidence between students who participated in high-fidelity simulation and students who did not participate (Yuan, Williams, Fang, Ye, 2012) .

Reflection is focused on the debriefing that occurs a simulated clinical experience. Reflection and reflective practice are inherent to all phases of simulation leaning activities (Horton-Deutsch, Sherwood, 2017). It is crucial to bridge the gap that exists between what students learn in the classroom and how they apply what they learn in their clinical practice. Little research exists to ascertain student reflection of using high-fidelity simulation as an adjunct to or replacement for clinical practice. This paper will fill that knowledge gap. The paper was to elaborate and analyze the conceptual framework of reflection, the methods of reflection following high-fidelity simulation among undergraduate nursing students.

Conceptual Framework

Reflection is critical to cognitive leaning and experience learning. When learners participate in authentic activities, there should be time for them to step back and reflect on the experience. In cognitive learning, the individual learns by listening, watching, touching, reading, or experiencing and then processing and remembering the information. Learners perceive stimuli and decide how to process the information and use previous experience to guide their behaviors or performance (Horton-Deutsch, Sherwood, 2017). Knowledge is generated when an individual's perspective is transformed as a result of exposure to the situation in which students are required to put their thoughts into action. Simulation activity allows students to increase their confidence and competence in a safe setting, to integrate a full range of knowledge, attitudes and skills to respond effectively.

Reflective practice increases in cognitive complexity parallel to the increase in simulation complexity in order to measure the increases in student conceptual learning (Decker, 2007). Kolb (1984) defined the experience learning as the process whereby knowledge is derived from and continuously modified by experience. Knowledge results from the combination of grasping experience and transforming it. The learning process is viewed as a context of people moving between the modes of concrete experience (feeling--learning from specific experiences), abstract conceptualization (thinking--logical analysis of ideas and acting on intellectual understanding of a situation), reflective observation (watching--observing before making a judgment by viewing the environment from different perspectives) and active experimentation (doing--getting things done by influencing people and events through action).

Simulation based learning offers students a unique opportunity to learn through experience, aided by reflection and feedback and the opportunity to practice. Simulation is highly engaging, interactive and clearly relevant to practice and enables experiential learning in a safe environment while promoting students' in-depth reflection about learning (Cheng, Grant, Robinson, et al., 2016). In simulation based learning, students have opportunities to reflect on their experience, have a period of emotional release, receive behavioral feedback, integrate their observations, behavior and feedback into a conceptual framework and then create mechanisms and pathways for transferring learning to relevant situations (Yuan, 2013). Reflection is the opportunity to reexamine the experience. Students may think about what comes to mind first and work through the experience from that starting point. Student engagement in the simulation can also elicit significant emotional response which can redirect the attention of the student to reflect on their learning. Students need to be coached to be open to receive feedback in a way that facilitates positive learning rather than a negative response. Teachers want students to demonstrate successfully that they can transfer what they have learned and experienced from one situation to the next. Summative evaluation should be clearly indicated as such, and debriefing should be formatted in a confidential, respectful manner between the facilitator and the learner. Simulation based learning provides opportunities for the integration of feedback and reflection, which increases the learner's ability to synthesize knowledge from multiple sources and make sound and safe decisions. Integration of the simulation experience and facilitated reflection into a conceptual framework is one of the most challenging for simulation (Turricci, Lewis, 2017).

Reflective Learning In Simulation

Simulation based learning provides opportunities for the integration of feedback and reflection, which increase the learner's ability to synthesize knowledge from multiple sources and make sound and safe decisions. Reflection occurs throughout each phase of simulation: before, during and after the simulated clinical experience. Educators need to provide learners with a safe environment conducive to learning without compromising client welfare while fostering their analytical thinking skills and rational decision making. Reflective learning can assist the students to enhance their cognitive abilities, and offer students the opportunity to practice their assessment and organizational skills which prepare them to deal with the current level of acuity and complexity in real situation.

The Designed Scenarios

The scenarios had sufficient intrinsic interest for the students and relevance to clinical practice and lead students to a particular area of study to achieve specified learning objectives. The scenarios stimulated students to analyze the situations critically and provide alternative solutions to real-world problems, and motivated them to probe for deeper understanding. The trigger questions stimulated the students' thinking broadly and critically by encouraging them to achieve the specific learning objectives. The scenarios were designed using the high-fidelity simulator

which is a computer-controlled human patient simulator (HPS, SimMan) which is a full-body manikin with a realistic upper airway, chest movement, variable cardiac and breath sounds and a palpable pulse.

Simulation and Reflection

The foundation and inherent to the reflective processes are knowledge, skills, attitude, experience and emotion. During the simulation, students use the reflective practice to help them make sense of the experience. The reflective practice includes the phases of before action, in action, on action and beyond action.

For example, the simulated scenario is concerned a patient with Chronic obstructive pulmonary disease (COPD). Mr. Wang, a 68-year old man, was diagnosed with COPD 10 years ago. He has a 40-year smoking history (is still smoking) and has been hospitalized twice due to chest infections during the last 12 months. His vital sign: T 36.8 °C, heart rate 96/min (regular), RR 18 /min, BP 130/75mmHg. His FEV1 is 26% and FEV1/FVC is 38%. SpO₂ is 83 %, Two hours later, SpO₂ is 80 %, respiratory rate is 30 /min, heart rate is 116/min. He complained he has trouble getting his breath. The arterial blood gases are reported as pH 7.25, bicarbonate (HCO₃⁻) 23 mEq/L (norm 22~26 mEq/L), PaCO₂ 55 mmHg (norm 35~ 45 mmHg), PaO₂ 56 mmHg (norm 80~100 mmHg). The physician prescribed the low-flow oxygen therapy.

Reflection before simulation

The preparation of simulation includes the orientation to environment and simulator and reflection on knowledge, skills, attitudes, experiences and emotion. Students received an orientation to the simulation laboratory to familiarize them with the technology and the simulation format. Students were assigned readings to help them focus on specific learning goals prior to the simulation. To provide a consistent and coherent experience, these preparatory materials used the same patient details that students would later encounter in the simulation. The open-end questions are used to guide reflection as students consider any similar patients they have encountered in the clinical setting. The reflective questions are: "If you have encountered the COPD patient, what are that like? " "what are the feelings when you encounter the patients?" The students who have no experience may fear the unknown and expect the peers who have the experience can help them to diminish or accelerate their concerns. Students who encountered the COPD patients in the previous clinical placement might recall the interventions, the performed clinical skills, and administered medications, and patient record and their feelings during the interaction with the patients. Then, students were given a brief amount of time to review the scenarios and discuss their approach to care. The group discussions are focused on the following questions: "What are the meanings of FEV1, FEV1/FVC, and SpO₂?"; "What does the report of arterial blood gases mean?"; "What kinds of problems are there in the scenario?"; "What additional data would you collect? Why?"; "How do you manage the hypoxemia at this moment ?"

Reflection in action

During the enactment of the scenario, the students were expected to demonstrate an emotional connection and relationship with the patient to enhance realism. They performed assessments and interventions using appropriate techniques and adhering to principles of safety. They explored the breathless and the provoking and relieving factors, and then they check the blood pressure, pulse, heart rate and respiratory rate, lung sounds, heart sounds and bowel sounds, and abdominal palpation, etc. They also manage any complaint of the clients, such as breathless, vomiting, nausea, cough, thirst and hunger. Based on the health assessment and laboratory examination, students defined the problems which required nursing care and their priorities. Then they implemented some interventions following medical orders, such as oxygen therapy, medicine administration and observe the patients' physiological responses and reassess the patient conditions. Tutors observe group performance and give supportive help. In simulation, students are exposed to the simulated scenario and initially determine what is happening with the patient. When students recognize an unexpected or abnormal condition, they pursue additional information through health assessment and history inquiries. Then students develop the care plan and identify nursing interventions through group discussion. During the simulation, students are struggling or frustrated and need a pause in the action. Students reflect on the periodic pauses in the action. This can allow the students to reflect on previous and current knowledge, skills, attitudes, experiences, and emotions. The reflection questions during the simulation are: "Are there any 'time-out' or 'freeze frame' occurred? What are they?" ; "Why the SpO₂ is not improved when continue mask oxygen therapy is performed?" " How to manage the breathless for the COPD patients? What are different managements between the oxygen therapies to the patients with or without COPD?"

Reflection on action

Reflecting-on-action involves critical self-analysis of the identification of decision points, and acknowledgement of strength and weakness in both skill performance and reasoning patterns. During the debriefing, students reflect on their performance and identify further gaps in knowledge and skills. Tutors help students to discover their shortcomings or mistakes and guide them to realize what needs to be improved in further scenarios. Students reflect

on what has happened, how they responded, and what needs to be improved in the next session. The integration of feedback and reflection increase the students' abilities to synthesize knowledge from multiple sources and make sound and safe decisions. The tutor encouraged and allowed students to express their feelings and concerns, which contributed to their comfort with reflection. The students were not given the answer to the problem. The tutor allowed the students to take risks with their learning by letting them discover their own mistakes and explore their abilities. Students learned from their mistakes and thought about what need to be improved in further scenarios. Each group simulation was video-recorded.

A debriefing session followed each scenario in the simulation laboratory. It focused on team care of the patient in terms of safe practice, priority setting, continuous assessment, communication and resource management. Students review the select segments of video-recorded simulation and discuss the following questions: "What are your feelings during the simulation?"; "Are there any mistakes? What are they?"; "What were the key concepts and skills you used in this session?"; "What do you need to learn more about in order to take care of patients in similar situations?"; "How about your confidence in managing the breathless if you encounter the COPD patients again?".

Reflection beyond action

The reflection beyond action is conducted in post-simulation. Reflection beyond action includes reflection on performance and reflection on evidence-based practice.

(1) Reflection on performance

The students review the videos, and critique the individual performance in simulation. Students review key points related to care of the patient with the particular problems encounter in the scenario. They focus the discussions on a specific condition, pertinent nursing assessments and interventions or medications. They are also guided to reflect on patient safety concerns and patient-orientated care, teamwork and collaboration. The reflection questions are : "What do you think of the group performance in terms of knowledge, skills, attitude ? What needs to be improved in the next session?"

(2) Reflection on evidence-based practice

Reflection on evidence-based practice can foster students have a philosophy that incorporates evidence-based practice and access to tools that can enhance clinical practice. Students are guided to reflect on the nursing management, oxygen therapy and rehabilitation for the COPD patients. The reflection questions are: "What are the current practices in the nursing care of COPD?"; "What are the best evidences on dealing with the breathless for the patients with COPD? " "What are the best evidences on oxygen therapy for the patients with COPD? "; "What are the rehabilitation interventions for the COPD patients"; "How to perceive patients' abilities to perform activities of daily living after rehabilitation?".

Students search for the evidences and critically appraise the evidences in terms of the study valid, the results and discuss about whether the results be applicable in caring for patients under the guidance of tutors. Then, they compare the multiple studies to see if they are in agreement with each other, and summarize the evidences which can be used in the simulated situation. Finally group discussions are guided to think about the following questions: "Are there enough evidences on taking care the COPD patients? Why some of evidences are not appropriate for dealing with the simulated situation? This learning synthesis helped the students to generalize the learning from the specific situation to a more general one.

As indicated in introduction, we have two major research questions. One of them is to find out whether the inception of index futures trading has destabilized the underlying stock index or not. We will examine the volatility of the underlying index before and after the introduction of futures in order to answer the first question.

Conclusions

Students must consider a variety of conflicts and complex factors in choosing the best practice while they are taking care of simulated patients. It is more important to give the feedback and guided reflection during the simulation. Students need to be supported by tutor and collaboration in the learning process. The reflective learning in simulation occurs in the concrete experience, active experimentation (debriefing), reflective observation, and abstract conceptualization[16].

In addition, integrating simulation into existing curriculum structures requires faculty commitment to enhance their own teaching skills and redesign existing programs. Organizational commitment is also essential for this innovative teaching method due to the significant resources required for program implementation and ongoing financial support. Additional studies to test the impact of this teaching method on learner performance, patient safety, clinical outcomes, and faculty perceptions and cost efficiency will provide valuable support for using high-

fidelity simulation in nursing education. As transfer of skill from the simulated environment to the clinical setting is essential, further studies need to be concerned with the impact of using simulation on behavior transfer in clinical practices.

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References

- Birkhoff, S.D.& Donner, C. (2010). Enhancing pediatric clinical competency with high-fidelity simulation. *The Journal of Continuing Education in Nursing* 41 (9), 418-423.
- Decker, S. (2007). Integrating guided reflection into simulated learning experiences. In P. R. Jeffries (Ed.), *Simulation in nursing: From conceptualization to evaluation* (pp. 73-85). New York: National League for Nursing.
- Cheng , A., Grant, V., Robinson, T., Catena, H., Lachapelle, K., Kim, J., Adler, M., & Eppich, W.(2016). The promoting excellence and reflective learning in simulation approach to health care debriefing: A faculty development Guide. *Clinical Simulation in Nursing*, 12, 419-428.
- Eppich, W. & Cheng, A.(2015). Promoting Excellence and Reflective Learning in Simulation (PEARLS) Development and Rationale for a Blended Approach to Health Care Simulation Debriefing. *Simulation in Healthcare*, 10 (2), 106-115.
- Horton-Deutsch,S.& Sherwood, G.D. (2017). *Reflective Practice: Transforming education and improving outcomes (2nd, edition)* (pp.182-208).Indianapolis, IN, USA: Sigma Theta International.
- Jeffries. P.R. (2008). Getting in S.T.E.P. with simulations: Simulations take educator preparation. *Nursing Education Perspectives*, 29(2), 70-73.
- Kolb, D.(1984). *Experiential learning: experience as the source of learning and development* (pp.13-45). Englewood Cliffs, New Jersey: Prentice Hall.
- Nash, R., and Harvey, T.(2017). Student nurse perceptions regarding learning transfer following high-fidelity simulation. *Clinical Simulation in Nursing* 13, 471-477.
- Sinclair,B., & Ferguson,K.(2009). Integrating simulated teaching/learning strategies in undergraduate nursing education. *International Journal of Nursing Education Scholarship*, 6(1), 1-11.
- Tanner, C. A.(2006). Thinking like a nurse: A research-based model of clinical judgment in nursing. *Journal of Nursing Education*, 45(6), 04-11.
- Turricci, N.,& Lewis,P.A.(2017). Student facilitation of simulation debrief: Measuring reflective thinking and self-efficacy. *Teaching and Learning in Nursing*, 12, 128-135.
- Yuan, H.B., Williams, B., & Fang, J.B.(2011). The contribution of high-fidelity simulation to nursing students' confidence and competence: a systematic review. *International Nursing Review*, 59(1), 26-33.
- Yuan, H.B., Williams, B., Fang, J.B.,& Ye, Q.H. (2012). A systematic review of selected evidence on improving knowledge and skills through high-fidelity simulation. *Nurse Education Today*, 32(3), 294-298.
- Yuan, H.B.(2013).The learning process and evaluation methods of simulation under the philosophical foundation of evidence-based nursing. *Journal of Nursing Science*, 28(1), 4-6.

Relationships Between Emotional And Intuitive Intelligence And Management-Decision Making Skills*

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Abstract

Emotional intelligence is the sense of one's own feelings and the feelings of other individuals. Emotional intelligence is gathered under five main headings. These: 1. A person's awareness of their own feelings, 2. Managing your own feelings, 3. Motivation of the person himself, 4. Empathy, 5. Social skills. The ability to immediately understand or know something based on emotions is intuition. Intuition helps to make decisions that feel safe. Scientists have discovered that the feelings born to us are the second brain. The reason for this is the large number of neurons that cover the intestinal walls. But those who are strong in intuition know that their feelings are filled with wisdom and intuition. Very powerful people with intuition need to spend time and time alone. So they can gather their inner powers and audition themselves. That is why such people have a very introverted personality. "Decision" is a choice between alternative actions in case of uncertainty. While trying to make a good decision, it must evaluate the positive and negative aspects of each option according to certain criteria and take into account all options. Uncertainty, perfectionism, fear of failure, anxiety and stress; are among the emotional difficulties that affect decision making. Especially in strategic decisions, risk and uncertainty increase. Management skills are grouped under three headings: Conceptual skills, human skills and technical skills. Depending on the level of management of an administrator, the need for these skills varies. Emotional intelligence and intuitive thinking can affect the number of decision-making criteria.

Introduction

The life is a learning process. Therefore, the people must master the ability to continue to learn as a self-directed and lifelong learner. Emotional intelligence can be learned and it also increases learning power. Emotional intelligence is conceptualized as an ability that can be taught, learned, and changed (Birks & Watt, 2007: p.368). The skills associated with emotional intelligence, such as perceiving, understanding, using, and managing emotions, can be improved through training that specifically addresses these skills (Johnson, 2015: p.183). Emotional intelligence is directly related to interpersonal communication. People with intrapersonal problems can be defined as those who struggle due to personal internal conflicts or anxiety. Whereas a certain degree of anxiety is useful for performance, to an excess it can become debilitating and lead to many other problems (Hendren, 1988: p.596). Emotional intelligence may significantly diminish employees' withdrawal intentions because of the ability to better regulate emotions. Being in positive affective states is of importance in the sense of not becoming despondent in the face of daily and even more profound obstacles occurring in organizational life (Carmeli, 2003: p.797; Kılıçaslan at all, 2018; Şeneldir at all, 2017a). Managers seek alternative ways of obtaining and interpreting information and knowledge. Here, managerial intuitive potential begins to play an important role. Intuition is considered to be one of the least defined and operationalized elements of human capital (Aydin at all, 2017c; Aydin at all, 2018; Şeneldir at all, 2017c; Fields, 2000). In recent years, there has been an increased interest in intuition. This is due to the characteristics of the environment in which modern managers are forced to work. Intuition enables decision making in situations of lack or excess of information, in conditions of risk and uncertainty, under time pressure and in the case of individual problems. It can be noted that contemporary decision-makers, especially at the strategic level, deal with exactly such situations and conditions. Based on the literature, it can be stated that intuition is most often defined as the act of cognition without rational inference. Optionally, it is recognized as a way of learning that takes place beyond consciousness, in which a decision-maker acquires knowledge, but is unable to identify the source of this knowledge. Intuition is used in every decision-making process, but with varying intensity. It may also be additional information in the event of an information gap. It acts as a kind of "signpost" that directs a decision-maker towards a favourable solution (Malewska, 2015: p.24, Şeneldir at all, 2017b). Management skills are grouped under three headings: Conceptual skills, human skills and technical skills. Depending on the level of management of an administrator, the need for these skills varies. Emotional intelligence and intuitive thinking can affect the number of decision-making criteria. How effective is emotional intelligence and intuitive thinking on management and decision making skills?

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Emotional Intelligence Concept And Definition

The success of the individual in both business and social life is influenced by many other factors besides intelligence quotient. One of these factors is emotional intelligence. Emotional intelligence has different sub-dimensions such as being aware of one's own feelings, understanding others' feelings, adapting to new situations and circumstances, solving problems between individuals, controlling individual feelings and being independent (Türker, 2016: p.7). Salovey and Mayer (1990), who have introduced the concept to the literature, have studied the dimensions of emotional intelligence; (1) being aware of emotions, (2) being able to cope with emotions, (3) being able to motivate oneself, (4) being able to notice others' feelings, and (5) being able to engage in relationships (Tuğrul, 1999: p.15). These dimensions can be expressed as dimensions that constitute emotional intelligence. Researchers have generally expressed emotional intelligence as "the ability of individuals to deal with emotions" (Wong & Kenneth, 2002: p.245). Erkuş (1998) defined the concept as having the necessary mental capabilities for selecting, forming and adapting any environmental position. Goleman (1996) defines the concept; "The individual has defined himself as able to act, to continue in spite of incompetence, to be able to postpone satisfactorily by controlling the prosperity, to regulate his mood, to empathize, to hope, to not allow problems to be prevented from thinking".

Emotional intelligence, in general, refers to the ability of an individual to have the ability to understand and use emotions, as well as being defined as the ability of an individual to be aware of their emotions and the feelings of the people around them (Nelson et al., 2003: p.9). Nelson et al. (2003) identified threeteen different dimensions of emotional intelligence, called the Emotional Skills Assessment Process, in the individual. Researchers; They developed a total of 213 expressions to measure the factors that they call what they call aggression, respect, consolation, empathy, decision making, leadership, self-esteem, stress management, difficulty in coping, time management, business ethics and change needs, tested on their students. Min (2012) suggests that some factors of Emotional Skill Assessment Process may be necessary to be successful in the tourist guidance profession; They have adapted the short version to tourist guides that include factors such as seeking, difficulty coping, time management, business ethics, change need and stress management. It has been emphasized that in both studies (Nelson et al., 2003 & Min, 2012), in which the individual's emotional intelligence is an intelligence that improves emotional intelligence skills, emotional intelligence may be possible if efforts are made to detect and eliminate weak abilities. The development of emotional skills and, consequently, emotional intelligence opens the way for the individual to be more successful in social and professional life.

Intuitive Decision-Making

Emotional nature, expression and responses are unwelcome in the business world. People acting on their emotional impulses are usually not seen as credible. We emphasise rationality and rational decision-making. By controlling our emotions, we suppress them, thereby also suppressing creativity (Kovacic et al, 2013: p.3). If we are able to trust ourselves and what we feel, intuition can take us beyond the borders of the known and act as a new partner in learning, action and acquiring of information necessary for holistic decision-making. In spite of very strong and positive initial feedback we find that the business world is still very reserved towards intuition. We all live with it, but we are reluctant to talk about it. The circumstances in which we use intuition are usually turbulent and chaotic, with complex and unstructured problems, quick shifts in consumer expectations, constantly shortened cycle of product development, the need for efficient and quick decision making without all necessary information, etc. We therefore use intuition in critical situations under the pressure of time when we cannot rely on other sources of information or there is no time to obtain the necessary information.

Senge et al. (2008) find that we make decisions and adhere to habitual patterns when we feel fear or pressure. Senge stresses that in the learning process an individual only hears what he or she can recognise, while the interpretation of the heard message depends on one's beliefs, past sensations and experience. He continues that due to the tendency to maintain entrenched patterns of behaviour an individual is only ready to change his or her actions within the boundaries of the known. This represents horizontal interaction between the phases of thinking and action where an individual exhibits only minor changes in actions. Using vertical interaction between the two phases we are able to reach deeper within ourselves which can result in radical changes in personality. Through the process of learning an individual deepens their knowledge of self. They discover their deeper personal levels, which in addition to thoughts also include emotions and will. Usually, this leads to uncovering hidden virtues which people can observe, develop and use consciously. In turn, this often leads to a change in personality, but only if they are able to recognise and change their habitual patterns.

At the deepest levels of learning, intuition is able to connect hidden threads of thought, emotions and will between seemingly unrelated ideas. Thus, we gain more comprehensive insight, and consequently the ability to make holistic decisions. Holistic decision-making leads to more comprehensive acting, particularly from the aspect of

socially responsible actions of individuals, groups and the society. Strategic business decisions are aimed at the future and thus very rarely revisable. The usefulness of knowledge and experience in this process is very limited therefore we rely on intuition and creativity. It is a proven fact that more intuitive decisions are made on the strategic management level than on the tactical and operational levels. Everyone uses intuition whether we are aware of it or not. Until we are able of conscious use of intuition, it is something that "happens" instead of being used. Therefore, we need to develop the ability to sense intuition and gain experience on how we use it as individuals (Kovacic, 2012: p.13). The process of intuition based decision-making is a useful business tool with an alternative approach and a different view of the decision making process.

There are three different categories or types of processes that the term intuition is often used to describe (McCraty & Zayas, 2014: p.58). The first type is often referred to as implicit knowledge or learning, which in essence, refers to knowledge we acquired in the past and either forgot or did not realize we learned. Drawing on the neuroscience conception of the human brain as a highly efficient and effective pattern-matching device, a number of so-called "pattern-recognition" models have been developed to show how this fast type of "intuitive" decision and action can be understood purely in terms of neural processes in which the brain matches the patterns of new problems or challenges with stored templates in memory based on prior experience. The second type is what we call energetic sensitivity, which refers to the ability of our nervous system to detect and respond to environmental signals such as electromagnetic fields. For example, it is well established that in both humans and animals, nervous system activity is affected by geomagnetic activity. Some people appear to have the capacity to feel or sense that an earthquake is about to occur before it happens. It has recently been shown that changes in the earth's magnetic field can be detected about an hour or even longer before a large earthquake occurs. Another example of energetic sensitivity is the sense that someone is staring at us. Several scientific studies have verified this type of sensitivity. The third type, which is the subject of several articles in this issue, is nonlocal intuition, which refers to the knowledge or sense of something that cannot be explained by past or forgotten knowledge or environmental signals. Examples of nonlocal intuition are when a mother senses something happening to her child, who is many miles away, or the repeated, successful sensing experienced by entrepreneurs about factors related to making effective business decisions.

Management Skills

Skill; from the knowledge that one earns through education, from his experiences, intelligence and innate abilities. "Management skills" are the factors that make the management case successful. According to Katz's Theory, a successful manager has triplet managerial skills (conceptual, human and technical). Managerial skills are required to implement quintuplet functions of management (planning, organizing, directing, controlling, evaluating) (Aydin at all, 2017a; Aydin at all, 2017b; Seyedinejat et al., 2014: p.34). Managerial skills are one of reasons in consecutive organizational successes. Management effectiveness and efficiency require managerial skills. The first scientific and structured discussion of "Management skill" was presented by Robert L. Katz. The article by this theorist, "skills of an affective administrator", was published in Harvard Business Review in January 1995. He has classified the required skills for a manager in three groups herein mentioned briefly but in the following sections, due to their pivotal role, each is explained separately and completely. According to his theory, technical skill is more important in lower management levels and conceptual skill is more significant in upper management levels and human skill is regarded equally important in all three management levels (Mirsepassi, 1991: p.23).

Technical skill implies an understanding of, and proficiency in, a specific kind of activity, particularly involving methods, process, procedures or techniques. Technical skill involves special knowledge, analytical ability within that specialty and facility in the use of the tools and techniques of the specific discipline (Robbins & Decenzo, 1998).

Human skill is the ability to understand, create motivation and work with employees. According to Robert Katz, human skill is the ability to work effectively as a group member and to build understanding and cooperative effort in the team he leads. Human skill is the ability of manager to work effectively as a group member and to build effective understanding and cooperative effort in the team he leads (Ahmadi, 2011).

One of the triple management skills is conceptual skill also known as perceptual skill, analytical skill, the skill based on general understanding, theoretical skill and cognitive skill. The skill based on general understanding is referred to as the power to consider institute as a whole unity i.e. manager must recognize how different functions of organization depend on one another and change in each part necessarily influences other parts. This skill can be extended to the understanding of the relationship between the said institution and industry in general and also society and political, social and economic factors of an entire nation. By recognizing such relationships and understanding the important elements in any situation, the manager would be able to act in a way that leads to the improvement of organization (Razaghi et al, 1991: p.35).

From Emotional Intelligence To Intuitive Intelligence

Along the same lines as emotional intelligence, the notion of intuitive intelligence appears slowly but surely. Intuition has been a privileged theme of neuroscience research over the last decade, and for researchers it is the mark of our subconscious intelligence. The brain, capable of stocking a phenomenal quantity of data, which for the most part escapes our conscious control, is capable of many achievements. It can, unbeknown to our own free will, make analogies, comparisons and associations. It is able to process a large quantity of data in record time and to proceed to a rapid analysis of a situation. All of this, in an unconscious way. For a long time overshadowed by rational intelligence, held in contempt and disregarded, the notion of intuitive intelligence is now beginning to interest companies, in particular when dealing with managements and leadership. Companies are perceiving that this new approach can be fruitfully combined with the necessity to be responsive in a constantly changing world (“Emotional intelligence, intuitive intelligence”, 2014).

The root of the term intuition stem from the Latin word in-tuir, which can be translated as “looking, regarding, or knowing from within” (McCrae & Zayas, 2014: p.57). In addition, intuition differs from other decision-making approaches that are typically viewed as “fast.” For example, intuition is similar to guessing only in terms of its speed. Guessing neither involves affectively charged judgments nor requires making associations through nonconscious information processing. It also lacks the secondary outcome associated with these two characteristics of intuition: certitude. Intuition is also different from instincts and insights. Instincts are innate capabilities that originate outside the experiential processing system. Unlike intuition, insight is often a lengthy process that begins with deliberate, analytical thinking that precedes the incubation period (Dane & Pratt, 2007: p.40).

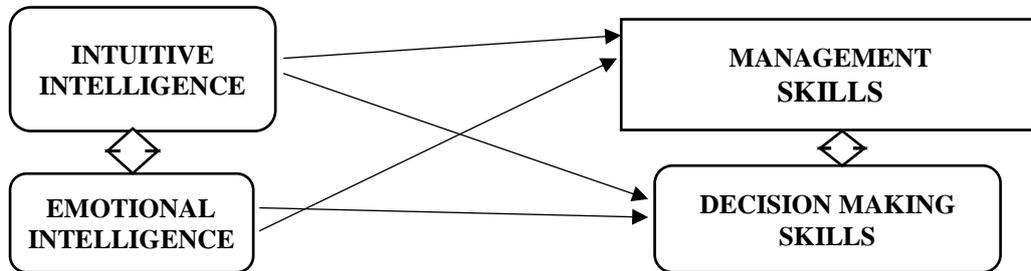
Intuitive intelligence contains several aptitudes, some of which also fall under the realm of emotional intelligence, linked to the comprehension of human nature. Among them:

- Aptitudes related to self-awareness: capacity to be in contact with, and to accept, one’s subconscious. Affinities with symbolic, analogical and metaphorical languages. Strong understanding of one’s own strengths and weaknesses. Capacity to be in agreement with oneself. Aptitude for introspection. Capacity to understand, identify and deal with one’s own emotions. Capacity to be in relation with the sensitive world.
- Aptitudes related to the awareness of others: ability to sense, be receptive to others and their feelings, understand subtle signals and what is left unsaid. Be predisposed to empathy, i.e. to be in tune with the other, to understand what he is living and feeling. Capacity to decipher body language. Ability to observe attentively.

The Effects Of Intuitive And Emotional Intelligence

Emotions help us to make good choices. Emotion is an internal sensation feeling that lets you know if something is pleasurable or not. Emotional intelligence often relies, in part, on intuition, but intuition is a more general tool. Intuition is about tuning into the energy around you and being able to pick up thoughts/emotions/ideas. The French philosopher and mathematician Blaise Pascal is famous for his aphorism “The heart has its reasons that reason cannot know.” In many cases, we use both conscious reasoning and intuition to solve problems (Jiles, 2018).

Figure 1: The effects of intuitive and emotional intelligence.



In times of uncertainty and change, the incorporation of intuition in the decision-making process has become imperative (Agor, 1989). Quinn (1980) argued that in times of ambiguity, intuitive synthesis enables experienced managers to size up a situation, integrate and assimilate large amounts of data, and deal with incomplete information successfully. Intuitive managers tend to be more emotionally intelligent (Downey et al., 2006: p.260).

Intuitions are affectively charged judgments that arise through rapid, nonconscious, and holistic associations. These characteristics not only capture what we mean by intuition but also help clarify which types of decision-making processes are intuitive and which are not. To illustrate, of all other ways of making judgments and decisions reviewed here, only the nonconscious use of heuristics and internalized patterns of information fall

within what we call intuition. In contrast, we believe that rational decision making is highly dissimilar to intuition. The former involves the use of systematic procedures designed to thoroughly assess all pertinent information, evaluate costs and benefits, and, ultimately, make a decision based on conscious deliberation. In short, it is highly analytic and relies on logical connections. In brief, intuition differs from more rational models of decision making in that it is (1) nonconscious, (2) holistic, (3) associative, and (4) faster (Dane & Pratt, 2007: p.40).

Strategic management is the process of specifying an organization's objectives, developing policies and plans to achieve these objectives and allocating resources so as to implement the plans and has a direct relationship with strategic alignment that influence motivation and can play an important role in emotional intelligence. In other words, individuals with high motivation tend to have higher emotional intelligence and this action lead to improve communication effectiveness. People with high motivation are likely to have good communication, and will probably be successful in anything they decide to do. On the other hand, people with low motivation are likely to have a hard time in communication with others (Jorfi et al., 2011: p.31). Theorists who advocate emotional intelligence reiterated that EI leads to enhanced effectiveness in communication. In another instance, it was indicated that workers sensed a better and nicer manager when he was trained in emotional intelligence. Without social skills, a person can easily misinterpret a look or a statement and react unsuitably or lack sympathy and be comparatively unaware of how their behavior affects others.

Conclusion

In this study, it is examined that relations of emotional intelligence and intuitive thinking with decision making skills. Furthermore, how this kind of relations influences management skills are discussed. One of the most important of management skills is decision making. Also, one of the most important elements of emotional intelligence is intuition. Our decisions affect our entrenched habits. The decision-making provides us with solutions for achieving the wanted benefits with as few unwanted consequences as possible. The circumstances in which we are making decisions are often not entirely clear and the available information usually limited. The question of being able to obtain adequate information for qualitative decision-making is always present. Intuition, knowledge and experience are the three natural channels that provide us with information necessary for holistic decision-making. We acquire knowledge based on learning. We acquire experience based on our actions. Our knowledge is affirmed and deepened through practical application and complemented by experience. We need to develop the ability to quickly and lastingly learn from our experiences. Repeating same experiences over and over and revisiting the same situations because we are unable to learn our lessons quickly and lastingly is futile endeavour. Another important aspect is the fact that learning and acting draw information from the conscious sphere, while intuition draws from the unconscious. If we make decisions based only on the conscious aspect, we subject to oversight and unilateral thinking. By searching our inner selves and using intuition we can reach information in the unconscious sphere which complements the information in the conscious. Only by merging the two information flows can we obtain adequate information for holistic decision-making. Decision-making process primarily depends on awareness developed through the processes of learning and acting. We also need to emphasise that there are two diametrically opposite types of consciousness: (1) consciousness directed inwardly towards its centre, and (2) consciousness directed outwardly. A regular person's consciousness is entirely outwardly directed. It is immersed in the outer world. Intuitive decision-making requires redirecting our consciousness from the outside towards the inside. The process of learning enables us to reach deeply within ourselves and uncover hidden personal qualities. Attempting to better utilise one's inner potential often leads to personal change. Accordingly, we change our existing behavioural patterns and start acting differently. Our actions become more holistic, and consequently we become more socially responsible as individuals, organisations and the society. Although holding on to the conscious and rational aspects of decision-making might be safer, this intuition based model for making business decisions is encouraging us to go beyond the borders of comfort.

Managers' effectiveness and efficiency requires having management skills and implementing these skills in various organizational situations and positions leads to achieving the objectives. Therefore, one can say that the manager, who has the required management skills and implements them in appropriate situations and conditions, is successful in fulfilling his duties and roles. Thus an important factor for being successful in management is management skill and ability to implement it properly. Decision making has long been regarded as a cognitive process resulting in the selection of a course of action among several alternatives. Especially in the business environment, the decision making has been based on rational analysis. However, the time available to examine data and relationships has been reducing. Moreover, the information needed for the analysis prior to decision making is often unavailable. Managers face a growing dissatisfaction with the established decision making processes. With a growing rate of the unprecedented change in the environment, intuition is becoming an important part in the decision making process. The empirical research of the relationships between human relations and conceptual management skills and intuitive emotional intelligence will contribute to the production of new knowledge.

References

- Agor, W. (1989). *Intuition in Organisations*, Sage Publications, London.
- Ahmadi, M. (2011). *Fundamentals of organization and management (General Management)*. (2th ed.). Sari-Iran: Pajoheshhaye Farhangi Publication.
- Aydın S., Of M., Kılıçaslan İ., Akça Ü., Kahraman K., Mutlu C. (2017a). Analysing of the Lecturer Practice at The Vocational School Mathematics. *Turkish Online Journal of Educational Technology*, SI, 284-287.
- Aydın S., Of M., Kılıçaslan İ., Akça Ü., Kahraman K., Mutlu C. (2017b). Teaching Abstract Mathematics in Vocational Schools: Teachers' Views. *Turkish Online Journal of Educational Technology*, SI, 15-19.
- Aydın S., Genel Y., Kahraman K., Tola Y., Of M., Mutlu C. (2017c). On the Level of Academic Achievement of The Vocational School Students: The Effect of Motivation. *Turkish Online Journal of Educational Technology*, SI, 653-657.
- Aydın, S., Genel Y. and Mutlu, C. (2018). Attitudes towards Online Web Assisted Learning: Business Management Students. *The Online Learning of Distance Education and e-learning*, 6(2), 34-40.
- Birks Y.F. & Watt I.S. (2007). Emotional intelligence and patient-centred care. *Journal of the Royal Society of Medicine*, 100(8), (pp.368-374).
- Carmeli, A. (2003). "The relationship between emotional intelligence and work attitudes, behavior and outcomes", *Journal of Managerial Psychology*, 18(8), (pp.788 – 813).
- Dane, E. & Pratt, M.G. (2007). Exploring intuition and its role in managerial decision making. *Academy of Management Review*, 32(1), (pp.33–54).
- Downey, L.A., Papageorgiou V. & Stough, C. (2006). Examining the relationship between leadership, emotional intelligence and intuition in senior female managers. *Leadership & Organization Development Journal*, 27(4), (pp.250-264).
- Erkuş, A. (1998). "Goleman"ın Duygusal Zekâ Görüşünün Psikometrik Açıdan Eleştirisi ve Dinamik Etkileşimsel Model Önerisi" *Türk Psikoloji Yazıları*, 1(1), (pp.31-40).
- Fields A.F., (2000). Intuition engineering, *Organizational Engineering Institute*.
- Fontaine, I. (2014). "Emotional intelligence, intuitive intelligence: the end of IQ hegemony", (2014, 12 February), Access Address: <https://histoireintuition.com/2014/02/12/emotional-intelligence-intuitive-intelligence-end-iq-hegemony/>
- Goleman, D. (1996). 'Duygusal zekâ neden IQ'dan daha önemlidir?', 39. baskı, Ankara: Varlık Yayınları.
- Hendren R.L. (1988). Predicting success and failure of medical students at risk for dismissal. *J Med Educ.*, 63(8), (pp.596-602).
- Jiles, D. (2018). "Intuition and Emotion in Creative Thinking". (2018, 15 Ağustos), Access Address: <http://www.innovationmanagement.se/imtool-articles/intuition-and-emotion-in-creative-thinking/>
- Jorfi, H., Jorfi, S., Yaccob, H.F.B. & Shah, I.M. (2011). Relationships among Strategic Management, Strategic Behaviors, Emotional Intelligence, IT-business Strategic Alignment, Motivation, and Communication Effectiveness, *International Journal of Business and Management*, 6(9), (pp.30-37).
- Johnson, D. R. (2015). Emotional intelligence as a crucial component to medical education. *International Journal of Medical Education*, 6, (pp.179-183). doi: 10.5116/ijme.5654.3044
- Kılıçaslan, I., Aydın, S., Türkeri, K. and Soydaş, H. (2018). Attitudes towards Online Web Assisted Learning: Accounting and Tax Students. *The Online Learning of Distance Education and e-learning*, 6(2), 27-33.
- Kovacic, V. (2012). A business model that reveals the background to the use of intuition in business relationships and decisions. V: IRDO Novice, Institute for the Development of Corporate Social Responsibility, Maribor, no. 6 / V, (pp.13-16).
- Kovacic, V., Bulc, V. & Battelino, U. (2013). Intuitive decision-making –changing habits through new business approaches, models and solutions. 8. *International IRDO Conference*, 7-9 March.
- Malewska, K. (2015). Intuition in decision making –theoretical and empirical aspects. *The Business and Management Review*, 6(3), (pp.23-31).
- McCraty, R. & Zayas, M. (2014). Intuitive Intelligence, Self-regulation, and Lifting Consciousness. *Global Adv Health Med.*, 3(2), (pp.56-65). DOI:10.7453/gahmj.2014.013.
- Min, J.C.H. (2012). "A Short-form measure for assessment of emotional intelligence for tour guides: Development and evaluation", *Tourism Management*, 33, (pp.155-167).
- Mirsepasi, N. (1991). Necessary of management skill, management studies. Faculty of Management and Accounting, Allameh Tabatabai University, (8), (pp.23-29).
- Nelson, D. B., Low, G. R. (2003). *Emotional intelligence: Achieving academic and career excellence*, New Jersey: Prentice Hall.
- Razaghi, M.E., Seyedinejat, S.S. & Dousti, M. (2014). Prioritizing managerial skills based on Katz's theory cast study: the managers of sports and youth in Mazandaran Province. *Pamukkale Journal of Sport Sciences*, 5(1), (pp.33-47).
- Robbins, P. & Decenzo, D.D. (1998). *Fundamentals of management. Essential concepts and applications*. Prentice

Hall, Inc.

- Quinn, J.B. (1980). *Strategies for Change: Logical Incrementalism*, Irwin, Homewood, IL.
- Salovey P., Mayer J.D. (1990). 'Emotional Intelligence' *Imagination, Cognition and Personality*, 9, (pp.185-211).
- Senge, P. et al. (2008). *Presence: Exploring Profound Change in People, Organizations, and Society*. Nicholas Brealey Publishing, London, UK.
- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional and Social Intelligence Against Inertia. *Turkish Online Journal of Educational Technology*, SI, pp.229-234.
- Şeneldir, O., Kudu, M. Genel, Y, Akça, Ü., Soydaş, Aydın., S. (2017b). Types of Behavior in Businesses and Resistance to Individual Change. *Turkish Online Journal of Educational Technology*, SI, pp.843-848.
- Şeneldir, O., Aydın, S., Kudu, M., Kılıçarslan, İ., Of, M. & Mutlu, C. (2017c). Kaizen and Intuition in Stress Management. *The Turkish Online Journal of Educational Technology*, SI, pp. 345-349.
- Tuğrul, C. (1999). "Duygusal Zekâ" *Klinik Psikiyatri*, 1, (pp.12-20).
- Türker, A. (2016). Effect of emotional skills assessment process on customer satisfaction: a study on tourist guides. *Journal of Travel and Hospitality Management*. 13(2), (pp.6-20).
- Wong, C.S. & Kenneth S. L. (2002). "The Effects of Leader and Follower Emotional Intelligence on Performance Attitude: An Exploratory Study" *The Leadership Quarterly*, 13(3), (pp.243-274).
- Ticha, I., Hron, J. & Fiedler, J. (2010). Managerial decision making – importance of intuition in the rational process, *Agric. Econ. Czech*, 56(12), (pp.553–557).

Review Of The ‘Guided Writing’ Lessons Provided For Hearing Impaired Students¹

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Abstract

When the literature for the writing skills of hearing-impaired students is reviewed, it is seen that there is a need for researches regarding the manner in which writing lessons are performed. In this study, it is examined how guided-writing, a writing component of the Balanced Literacy Instruction Approach (BLIA), is performed with hearing-impaired students. This is a teacher research conducted through action research, with the participation of seven hearing-impaired students enrolled to the School for the Handicapped of Anadolu University in the 2015-2016 academic year. As a result of the study, it was determined that individual supports provided during the lessons increase the students’ motivation levels and writing lessons structured towards the improvement of certain skills bring benefits to the students. The guided writing component is thought to indirectly support the said improvement.

Keywords: *Hearing-impaired university students, guided-writing, teacher’s role*

Introduction

Written expression is a study in which emotions, ideas and events are narrated in a certain order. During the writing lessons, teachers should guide their students regarding the writing process and regulating it in order to ensure that the process affects the writing performances of the students positively (Fountas and Pinnel, 1996; Richards and Renandya, 2008). Writing process consists of the pre-writing, drafting, revising/editing and publishing stages (Cristie, Enz and Vukelich, 2003; Graves, 1983; Tompkins, 2000).

In the implementation of curriculums, various approaches are used for the improvement of both hearing-impaired and non-impaired students’ literacy skills. The effectiveness of the BLIA that supports the students in the amount required and when they need during the literacy lessons have been revealed in different researchs (Karasu, Girgin, Uzuner and Kaya, 2012; Kaya, 2012; Pressley, Roehrig, Bogner, Raphael and Dolezal, 2002; Schirmer, 2000; Uzuner, 2007; Uzuner, Girgin, Kaya, Karasu, Girgin, Erdiken et.al 2011; Wolbers, 2008). The approach, which aims to ensure that students become independent literates, advocates that students make decisions and selections on literacy subjects and control their levels of learning themselves, education reflects real living environments and lessons are performed in a metacognitive manner (Asselin, 1999; Fountas and Pinel, 1996; Pressley et. al., 2002; Tompkins 2000). In the said approach, lessons intended for the improvement of writing skills are performed with the shared-, interactive-, guided- and independent-writing components. In the process from shared-writing to guided-writing, the student is initially dependent on the teacher during the lessons performed in line with the abovementioned principles. With the improvement ensured on the student’s writing skills during the process, the amount and type of the support given to him or her changes. The teacher’s role is to ensure students’ improvement with the support he or she provides.

Writing skills of BLIA, namely the shared-, interactive-, guided- and independent-writing, are seen to offer a hierarchical process. When certain skills are acquired by the students, they start to write texts by use of the features of the next stage (Tompkins, 2007). However, when the teacher realizes a need through various evaluations carried out during the lessons, previous stages can be brought into use again in order to make repetitions (Karasu and Uzuner, 2018; Richards and Reynandya, 2008; Wolbers et. al. 2018). In shared- and interactive-writing, a single common text is written on the board. While it is the teacher who always holds the board marker in shared-writing, in interactive-writing, both the teacher and students write on the board as required (Cristie, Enz and Vukelich, 2003). In the next stage, guided-writing, each student writes a text. While the text is written by a student, the teacher checks it and provides support by making corrections if necessary. In the first three stages, subject determination and pre-writing are done together with the teacher. On the other hand, in independent-writing, subject determination, pre-writing and drafting are all done by the student (Cristie, Enz and Vukelich, 2003; Tompkins, 2000).

Students who experience problems in the improvement of writing skills need to be taught how to write (Cristie, Enz and Vukelich, 2003). For teachers and researchers who perform lessons based on the principles and components of BLIA, the question “How?” is answered through another question: “Which writing component is to be implemented in the writing lesson?”. The writing component to be used is determined as a result of the formal

¹ This study was supported by Scientific Studies Research Projects, Anadolu University (Project number: 1505E440).

and informal evaluations carried out by the teacher. Since this study is about the manner of implementation of guided writing in writing lessons for hearing-impaired young persons, guided writing is addressed in details.

Guided Writing. Guided writing is performed with students who have already acquired certain information and skills of written expression with shared- and interactive-writing. As is known, writing is a complex skill requiring the joint use of certain processes and strategies. In this process, especially for individuals experiencing difficulties in writing for various reasons, guided writing is implemented for a certain purpose (reinforcement of the text structure knowledge, teaching the strategy for founding out the meaning of words based on the text, answering of cloze-type questions, etc.) with the whole class or small student groups requiring support on a certain matter in the class. Other features of guided writing can be listed as follows (ILA; 2018; Tompkins, 2007; Wolbers, 2008)

- Subject selection and the pre-writing stages of the writing process are performed together with the teacher. Each student writes a separate text individually.
- Twenty-minute lessons are planned for small groups with similar needs. The time can be extended to one full class hour for students in higher age groups.
- While the students write their texts, the teacher walks around the students and provides instant feedback. He or she teaches the writing strategies, skills and notions and the way to be followed in writing. Only one or two strategies should be taught in one lesson.
- In the guided writing process, the teacher acts as a model intensively, in particular about the implementation of the review and correction stages.
- After the texts are written by the students, the texts are reviewed and corrected during group language lessons or individual writing correction studies.
- After the students finalize the process, it should be ensured that the texts are shared in various ways. Such sharing is important in providing the students with the opportunity to experience the whole writing process for the texts written.

In shared- and interactive-writing, the teacher acts as a model in teaching the strategies and structuring of the sentences to be written. On the other hand, in guided-writing, while the teacher continues to act as a model when needed, the students make internal dialogues and the teacher should motivate them to realize such dialogues (Baker, Gersten, and Graham, 2003). Internal dialogues are known to help students to become independent or better authors (Wolbers, 2008). In the said process, they learn metacognitive strategies by questioning and controlling themselves (Schirmer, 2000).

It is important to repeat works on a daily basis (French, 1999), since literacy is supported during guided writing while the students actually talk, think and question through the text. They at the same time question themselves in written and gradually assume responsibility regarding the level of their learning. The teacher plays an important role in all these processes (Wolbers, 2008).

According to Wolbers (2008), French (1999) emphasizes the importance of the teacher in playing his or her role in a proficient and sensitive manner. French (1999) states the roles to be played by the teacher as accepting or, if needed, properly interpreting and reformulating the language/sentences of the students; acting as a model in the strategy of writing by thinking aloud; providing support to the extent needed (providing verbal scaffolds); delegating the control gradually to students; ensuring that all students are active in the process; and ensuring a correct timing of asking questions, giving explanations, listening to students, acknowledging and giving suggestions. While improving the students' writing skills, the teacher should plan the lessons so as to support the improvement of the other components of language, namely reading/comprehension, listening and speaking skills (Cambra, 1994). Frequent implementation of reading/comprehension activities in the guided writing process would indirectly support the development of the students' knowledge of language (Wolbers et al., 2018).

Another critical role played by the teacher in BLIA is about the use of different writing components. The teacher should be able to make returns among or repetitions on shared-, interactive-, guided- and independent components. Through the ongoing evaluations he or she carries out, the teacher monitors the development of the students and makes plans and decisions regarding the present and future lessons (Karasu and Uzuner, 2018; Richards and Reynandya, 2008; Wolbers et al., 2018). As an example, he or she decides when and how to pass on to shared-and/or independent-writing from the guided writing lessons; or after starting a lesson with guided-writing, he or she can decide to continue by passing on to shared-writing if necessary (Wolbers et al., 2018). To give place to returns among and repetitions on different components in the approach is important in particular for hearing-impaired students, who experience limitations in language (Schirmer, 2000; Rupley, Blair and Nichols, 2009).

When the literature on the writing skills of hearing-impaired students is reviewed, international publications are

seen to address certain subjects in certain periods up until today. While the initial researches focussed on words and syntax in relation to literacy (Albertini and Schely, 2003), the perspective towards the teaching of writing changed in 1970s and the limitations of sentence-level language and writing teaching was started to be discussed (Krestchmer and Krestschmer, 1978). Teachers began to ask students to write free texts about their own life experiences or diaries instead of writing in a certain matter. It was determined that the interaction during the writing process affected positively both hearing-impaired and non-impaired students who are timid in to writing (Graves, 1983; Truax, 1985). The study conducted by Gormley and Sarachan-Deily (1987) to determine the strengths and weaknesses of hearing-impaired students in writing is considered important. In 1990s, the related literature concentrated on the examination of sentence and story structures expressed by hearing-impaired students in different age groups and the teaching and use of strategies (Cambra, 1994; Klecan-Aker and Blondeau, 1990; Yoshinaga-Itano and Downey, 1996). Following researches (Mayer, 2010; Strassman and O'Dell, 2012), in which studies towards the enrichment of text content through syntax and meaning, shows that the writings of hearing-impaired students reflect similar characteristics and ideas when compared to the writings of their non-impaired peers.

In recent years, the studies conducted by Wolbers et. al. (Wolbers, 2008; Wolbers, Dostal and Bowers, 2011; Dostal and Wolbers, 2014; Dostal, Wolbers and Kilpatrick; 2016; Wolbers et. al. 2018) to address interactive-writing as a component of BLIA have become prominent. Four different researches are seen to exist in the literature, regarding the correction stage of the writing process. However, while those studies address the mistakes done by hearing-impaired students, any discussion about the process of correction is not presented (Crawford, Lloyd and Knoth, 2008; Gormley and Sarachan- Deily; 1987; Livingston; 1989; Yuknis; 2014).

The first study on the writing skills of hearing-impaired persons in Turkey was done by Tuncay (1980) regarding the effects of hearing impairment on the written expression skill. When the researches that can be accesses are classified based on their subjects, two different subjects are seen to be addressed. The first one is the researches focussed on the strength and weaknesses of the writings of hearing-impaired students who receive education in different environments (Efe and Karasu, 2017; Erdiken, 1996; Girgin and Karasu, 2007; Karasu and Girgin, 2007). The second subject is the approach to be used in the pre-writing and writing stages, the activities that can be performed and their effectiveness (Alatlı and Servi, 2017; Erdiken 1989; Erdiken, 1996; Karasu and Uzuner, 2018; Karasu, Uzuner & Beral, 2018).

The researches done by Erdiken (1996) and Karasu (2004) for the development of measurement tools for the evaluation of hearing-impaired students' written expression skills as an important component of the writing process are considered important. Another study of Karasu (1024) addresses the types, units and methods of correction needed to be implemented for hearing-impaired students in writing correction studies. In addition, the literature includes a research conducted to determine the problems encountered by hearing-impaired students while creating texts in the writing process (Tiryaki, 2014), and another research in which the reading comprehension and writing skills of hearing-impaired students with cochlear implant are compared (Cizmeci ve Cirput, 2018).

Writing researches are seen to address the effectiveness of teaching approaches, strengths and weaknesses of students, problems and cause-effect relationships related to the writing process. There are limited number of researches related to the subject of this paper, namely the writing process, stages of the writing process and the writing implementation of BLIA. In the literature, it is specified that there is a need for qualitative researches about the way of implementation of writing process stages for the improvement of students' writing skills (Karasu, 2014; Yuknis, 2014). In addition, it is suggested that researches to be conducted by teachers would be more effective with the advantage of field application (Vostal and Ward, 2015). In this direction, the objective of this study is to examine the implementation of guided writing for hearing-impaired university students as a component of BLIA.

Methods

This is a teacher research done through action research. In action researches conducted by teachers, teachers analyse their own practices or a problem or action in a systematic and regular manner (Johnson, 2002). However, while supporting the learning process of students, they also contribute to the professional development of teachers (Creswell, 2005). In action researches, after the problematic situation is determined, data collection, data analysis, action planning, trustworthiness committee meetings and reporting are performed in a cyclic manner. Figure 1 shows the cyclic process of an action research.

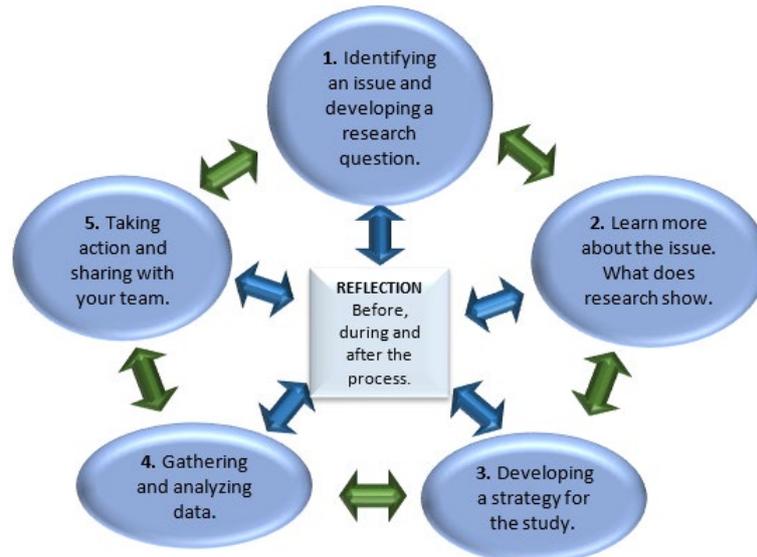


Figure 1: Action research cycle (KNILT, 2011)

Setting

The research was conducted at the School for the Handicapped of Anadolu University, which is the only institution providing higher education to hearing-impaired university students. The education is provided for the Graphical Design and Ceramic undergraduate and Building Drafting and Computer Operation associate degree programs. Research data were collected in the language class 214 of the School. Sound insulation was provided for the class and other physical properties of the class were arranged in line with the needs of hearing-impaired students (Girgin, 2003).

Participants. The research was conducted with the participation of second year students enrolled to the Computer Operating associate degree program in the 2015-2016 academic year. Other properties of the students regarding language skills are given in Table 1. Communication was made with Whole Language. Before the research, the participants were informed about the objective and procedure of the research and signed consent letters were obtained.

Table 1: Student Properties

Student	Age Gender	Degree of hearing loss (better hearing ear)	Age of onset of hearing impairment	Age of diagnosis	Age of onset of hearing aid	Secondary education environment
1	23/M	113 dB HL	Congenital	1	2	Vocational High School
2	22/F	101 dB HL	0.10	0.10	2	
3	25/F	96 dB HL	Congenital	1	14	Vocational High School for Hearing Impairments
4	19/F	110 dB HL	Congenital	2	19	
5	22/M	118 dB HL	Congenital	6	-	
6	25/M	83 dB HL	Congenital	5	12	
7	23/M	70 dB HL	Congenital	11	16	

When the written expression levels of the students were reviewed before the research, it was seen that the level of knowledge of five students about text structure was very limited and they could not include titles in their writings. On the other hand, when the content of their texts were reviewed, three of the students were seen to provide suitable content, while another three of them were unable to write in line with the instructions given. One student was understood the need limited support. All students were observed to have limitations in terms of syntax, vocabulary and orthographic rules and punctuation and be in need of intensive support.

Researchers. The research team consisted of one advisor and two researchers who all had 21 years or longer experience in the education of hearing-impaired students. They have graduate or postgraduate degrees in the field of hearing-impaired students' education. The research team members, who lecture at undergraduate and graduate levels, took part in conferences about qualitative conferences and participated in projects are implementers or

researchers. Their researches were published in national and international peer-reviewed journals.

Data collection techniques and analysis

Both qualitative and quantitative data collection methods and techniques were used in the research. The research data consists of video recording of the actual classroom interactions (33 h and 4 min), 11 writing lesson plans and reflections, reflective journal entries, students' artifacts, archival data, (audiograms, the official records of the students) and criterion referenced tests. The data collected were analysed through the inductive method, results obtained were reported by being associated with each other and the literature.

The validity study was done through the inspection of the research process, data and implementation qualification by the trustworthiness committee (Creswell, 2005). Ten trustworthiness committee meetings were held between 18th of September 2015 and 9th of February 2016. (trustworthiness committee meeting minutes)

Quantitative data of the research were collected with criterion referenced test in order to determine the level of improvement in the writing skills of the students. The preliminary and final tests were performed on 5th of October 2015 and 12th of January 2016 respectively. The students were asked to provide five written expression data including three newspaper reports and two expository texts on different topics. For determining the suitability of written expression questions for the ages, levels and areas of interest of the students, a validity study was conducted by receiving expert opinions. Vocational education and needs of the students were taken as the basis in determining the types and topics of the texts.

The texts were then evaluated by use of the "Written Expression Skills Evaluation Tool" developed by Erdiken (1996). Written texts were evaluated for text structure (0-30 points), content (0-20 points), grammar (0-25 points) and orthographic rules/punctuation (0-5 points). The inter-evaluator reliability, which was calculated with the $Agreement / Agreement + Disagreement \times 100$ formula, was found to be 84.8% and 71.9% for the preliminary and final tests respectively. On the other hand, implementation reliability coefficient of the lessons performed based on the principles and components of BLIA was calculated to be 94.5% with the $Observed\ Implementer\ Behaviour / Planned\ Implementer\ Behaviour \times 100$ formula.

Findings

In this section of the paper, firstly the research process is explained in brief. Afterwards, the answer to the research question is given.

Research Process

This study includes the analysis of the data collected in the implementation process of the research, which consisted of the pilot study and implementation processes. The data were collected between October of 2015 and January of 2016, in the Speaking Skills for Computer Operate Training III lesson. Total duration of the lesson was 135 minutes with three 45 minutes lessons (3x45 minutes).

Implementation of the Guided Writing Process with Hearing Impaired University Students

During the implementation process of the research, nine different newspaper report and expository texts were written by use of the BLIA components. Table 2 shows the writing components, topics and dates of the texts. Three of the texts were written with guided-writing. In this study, the writing process of the "Technology news writing" topic, performed on 22nd of December 2015, is presented, since it reflects all features of guided-writing.

Table 2: Writing components, topics and dates of the texts

BLIA Writing Component	Subject and Date of the Text
Interactive Writing	Writing a Facebook message (6 October 2015)
Interactive Writing	Content analysis of the school newspaper (27 October 2015)
Guided Writing	Y. Buyukersen Wax Museum Trip (6 October 17-18 November 2015)
Independent Writing	Writing a text with the topic of choice (3-10 November 2015)
Interactive Writing	Yılmaz Buyukersen's life (24 November 2015)
Guided Writing	Technology news (1-22 December 2015)
Interactive Writing	Comparing the features of websites (15 December 2015)
Independent Writing	Writing news with the topic of choice (1 December 2015-5 January 2016)
Guided Writing	Thoughts and feelings about Facebook (5 January 2016)

The text topic was determined by the teacher taking into consideration that the students were enrolled to the Computer Sciences Department and they were in need of reading texts with computer and technology content. Although it is important in BLIA that the students make topic selections and decisions, it is also important that the topics are determined sometimes by the teacher and sometimes by the students in a balanced manner (Pressley, Roehrig and Bogner, 2002; Tompkins, 2007). The role of the teaching in the establishment of this balance is critical (Wolbers, et. al., 2008). Besides, it is important to ensure that reading and writing skills are improved together, since different language skills indirectly support the improvement of each other (Cambra, 1994). Before the guided writing lesson on 22nd of December 2015, two interactive-writing, one guided writing and two independent-writing studies were conducted with the students. In the said writing components, the amount and implementation of the support given to the students differed. Based on the evaluations made before, during and after the lessons, the research team decided at the trustworthiness committee meeting dated 18th of November 2015 to implement guided writing in the lesson after the two independent-writing studies. (trustworthiness committee meeting minutes dated 18th of November 2015) Different stages of the sample writing process performed through guided writing are presented below under the titles pre-writing, drafting, writing, review, correction and publishing.

Pre-Writing Stage. The pre-writing stage was performed both before and during the lesson. The writing topic was announced to the students both in written and verbally during the lesson on 1st of December 2015. The teacher wrote the instructions on the board and asked the students to copy them in their notebooks. The instructions were “Please review the newspaper reports and select one report in the field of technology (computer, mobile phones, automobiles, etc.). You will present the news you select in the classroom both in written and verbally. Deadline is 15th of December 2015”. The students were also asked to select another report they are able to understand and change their selection, if they are not able to comprehend what they read.

Although it was announced to the students that they would present the selected technology report on 15th of December 2015, the lesson could be performed in the following week, on 22nd of December 2015, since the correction of the written texts took longer than expected. The reason of delay was explained to the students. (Lesson plan evaluation dated 15th of December 2015)

In the class part of the pre-writing stage, the technology news reports and expository texts selected by the students in the internet and from the newspapers were reviewed. This ensured students (except one of them) to perform reading comprehension works before the presentation lesson about the texts they would present, and attend the lesson ready. (Lesson plan evaluation dated 15th of December 2015)

At the beginning of the lesson, the teacher reviewed the technology news reports brought by the students as they attend the classroom and became informed about the content of the reports. Afterwards, each student presented his or her news report at the teacher’s stand they explained the points that cannot be understood by use of sign language or by writing on the board (Figure 2). When the meaning of a word is not known or the news report cannot be understood with the narration of the student, the teacher made written and oral explanations with the help of other students who can effectively use the sign language. At the end of each presentation, the presenter asked “Do you have any question?” In case there is no question from the class, the teacher asked several questions in order to make repetitions on the report. The pre-writing stage took 31 minutes for being completed.



Figure 2: A student presenting her news report

Drafting and Reviewing Stage. Since the writing was made through guided-writing, “drafting” and “review” stages were performed at the same time. Each student selected his or her own news report or a news report presented by one of his or her friends and wrote the related texts individually. It was seen that the ability to select

a news report presented by others increased the level of motivation. It is thought that it was because the students who had difficulty in comprehending the text they presented had the chance to write other news reports that was discussed and repeatedly explained in the classroom. (Reflected Evaluation of the Lesson Dated 22nd of December 2015)

The students were observed to make progress in terms of “text structure and content” in the previous lessons. Thus, the teacher focussed on the correct writing of “words and affixes” during the review in the lesson dated 22nd of December 2015. While the students were writing their texts, the teacher walked around the classroom and reviewed the texts written. In case there was a problem in the writing of words or affixes, the teacher gave information in written and/or verbally about the tenses required to be used in writing of newspaper reports and corrects uses of words by asking questions such as “It this word written correct?”, “How do we write the word ‘screen’?” and “Did you see this incident? In which tense should we write?” (Karasu and Uzuner, 2018). When necessary, he or she received sign language support as well. With these supports, the teacher asked the students to correct their mistakes. (Figure 3) The teacher considered the level of the student when deciding to correct a mistake directly, or ask the student correct is him or herself by directing questions (Pressley et. al. 2002; Tompkins, 1997; Wolbers, 2008).

The drafting and review stages performed at the same time took between 5 and 11 minutes to be completed. The time spent for the writing of the texts was dependent on the language skills of the students. Students with higher level of language skills completed writing in shorter time (Marcschark, Lang and Albertini, 2002).



Figure 3: Examining the writings and giving feedback

Editing Stage. Reviews made during the writing of the texts through guided writing by hearing-impaired students are not considered sufficient. For this reason, the researcher conducted nearly 10-minute “Individual Writing Editing” studies with each student after the completion of drafting. (Figure 4) While the researcher was doing editing studies with each student, other students were ensured to work in groups of two. During the said “peer studies”, they were asked to read each other’s writings and make editing. However, the editing capacity of the students was seen to be limited (Gormley and Sarachan-Deily, 1987). Editings for words, syntax, orthography and text structure were made with each student (Karasu and Uzuner, 2018). During the editing, problematic grammar rules were not brought to the students’ attention, while the sentence structuring requirements imposed by the rules and the effects of such structuring on the meaning were emphasized (Karasu, 2014). Individual text editing took 50 minutes.



Figure 4: Examples of individual writing editing

Publishing Stage. In this stage, each student read aloud his or her text in the classroom, accompanied by sign

language performed by him or herself or another student. Presentation of the texts in this way took 7 minutes.

Two lessons were combined in a block lesson. Pre-writing, review and drafting took 42 minutes, while 58 minutes were spent for individual mistake correction and publication. A break of 15 minutes was given between the two activities.

Pre-test and final tests were applied to determine the effectiveness of the lessons performed with the principles and components of BLIA. As seen in Figure 5, all students made progress in terms of written expression skills, even if limited.

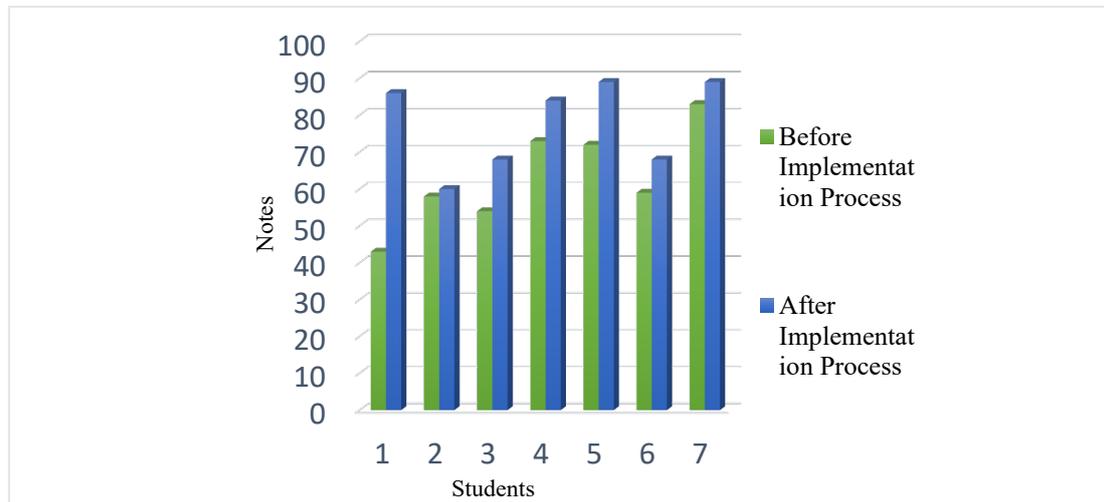


Figure 5: Impacts of the application of writing process activities

Writing is a complex skill requiring the joint use of different skills. This kind of studies conducted with hearing-impaired students would be more effective if done in longer period of time. It is thought that the studies done three times during the research indirectly affected the improvement of the students' written expression skills. Another reason of this result is the hearing-impaired students' need for more repetitions, because of language limitations (Luckner and Cooke, 2010; Paul, 1998; Rupley, Blair and Nichols, 2009; Schirmer, 2000).

Conclusions

The lessons performed in line with the principles and components of BLIA were seen to bring benefits to the hearing-impaired students, even if limited. It is thought that the guided writing studies done three times during the research indirectly affected the improvement of the students' written expression skills. It is very important to support hearing-impaired students in accordance with their language levels and when they need. In this study, in which different BLIA components were implemented, the contribution of each approach to the development of the students was valuable.

In the guided writing stage of the research, the attention of the students was brought to syntax and orthographic rules, taking the progress made by them into consideration. However, since reading and writing teaching requires a complex and long process, it is important to perform subsequent lessons in a planned, systematic and regular manner, so as to improve all features of writing. In this context, evaluations made before, during and after the lesson are critical. It is important for the teacher to plan his or her lessons in advance through continuous studies.

The way in which the lesson was performed was seen to increase the level of motivation of the students. Focussing on just two skills during the review stage made it easier for the students to cope with the skills expected to be improved. It was ensured that the students' experiences regarding the review of the correct writing of words and affixes were reinforced. In the individual correction stage, repetitions regarding text structure and content were made in addition to the emphasis on the writing of words and orthographic rules.

Results of the research revealed the effectiveness of writing lessons. However, it must be taken into consideration that it takes long time for hearing-impaired students to improve language skills, they need intensive repetitions and lessons are required to be performed in a systematic manner.

In the light of the data obtained with this study, guided writing lessons can be planned for hearing-impaired

students. In addition, the research can be repeated in different education environments, with different participants and by different researchers for the generalization of the findings.

References

- Alatlı, R. & Servi, C. (2017). Ortaokula devam eden isitme engelli öğrencilerin yazı performanslarının incelenmesi: Örnek grup Çalışması *Ankara Üniversitesi, Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi*, 18(1), 27-43. doi: 10.21565/ozelegitimdergisi.292065
- Albertini, J. A. & Schley, S. (2003). Writing, characteristics, instruction and assessment. In Marschark, M. & Spencer, E. P. (Eds.) *Oxford handbook of deaf studies, language and education*. (pp. 97-109) New York: Oxford University Press.
- Asselin, M. (1999). Balanced literacy. *Teacher Librarian*, 27(1), 69-70.
- Baker, S., Gersten, R., & Graham, S. (2003). Teaching expressive writing to students with learning disabilities: Research-based applications and examples. *Journal of Learning Disabilities*, 36(2), 109-123.
- Cambra, C. (1994). An instructional program approach to improve hearing impaired adolescents' narratives: A pilot study. *The Volta Review*, 96(3), 237-246.
- Cizmeçi, H. & Cirput, A. (2018). Evaluation of the Reading and Writing Skills of Children with Cochlear Implants. *The Journal of International Advanced Otolaryngology*. Doi: 10.5152/iao.2018.4436
- Crawford, L., Lloyd, S. & Knoth, K. (2008). Analysis of Student Revisions on a State Writing Test. *Assessment for Effective Intervention*, 33(2), 108-119. Doi: <https://doi.org/10.1177/1534508407311403>
- Creswell, J. W. (2005). *Educational research: planning, conducting, and evaluating quantitative and qualitative research*. Columbus: Upper Saddle River.
- Johnson, P.A. (2002). A short guide to action research. Boston, MA: Allyn and Bacon, Inc.
- Dostal, H. M., Wolbers, K. A., & Kilpatrick, (2016). Differentiating writing instruction for students who are deaf and hard of hearing. *Journal of Deaf Studies and Deaf Education*, 17(1), 19-38.
- Dostal, H., M. & Wolbers, K. A. (2014). Developing language and writing skills of deaf and hard of hearing students: A simultaneous approach. *Literacy Research and Instruction*, 53, 245-268. doi: 10.1080/19388071.2014.907382
- Efe, A., & Karasu, H. P. (2017). Kaynastırma eğitimine devam eden isitme engelli öğrencilerin yazdıkları öykülerin incelenmesi. *Ankara Üniversitesi Eğitim Bilimleri Fakültesi Özel Eğitim Dergisi, Elektronik Yayın*, 18(1), 27-43. doi: 10.21565/ozelegitimdergisi.330878
- Erdiken, B. (1989). Eskisehir Sağır Okulu ve Anadolu Üniversitesi İCEM'de ortaokul sınıflarına devam eden 13-14 yaş isitme engelli öğrencilerin yazılı anlatım becerilerinin betimlenmesi [The description of written expression skills of 13-14 year old hearing impaired students who continue to Eskisehir Hearing Impaired Middle School and Anadolu University in İCEM] (Unpublished master thesis, Anadolu University, Institute of Social Sciences, Eskisehir, Turkey). Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>. (Thesis Number 8901)
- Erdiken, B. (1996). Anadolu Üniversitesi İCEM lise düzeyindeki isitme engelli öğrencilerin yazılı anlatım becerilerinin geliştirilmesinde işbirliği-gözlem yöntemi ile anlatım yönteminin karşılaştırılması [Comparison of cooperative-observation method in the development of written expression skills of the hearing-impaired students at Anadolu University İCEM high school level] (Unpublished doktarate thesis, Anadolu University, Institute of Social Sciences, Eskisehir, Turkey). Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>. (Thesis Number 51390)
- French, M. M. (1999). Planning for literacy instruction: Guidelines for instruction Sharing ideas (ERIC Document Reproduction Service No. ED475330). Washington, DC: Laurent Clerc National Deaf Education Center. (Retrieved from Wolbers, 2008)
- Fountas, I. C., & Pinnell, G. S. (1996). *Guided reading, good first teaching for all children*. Portsmouth, NH: Heinemann Educational Books.
- Girgin, M. C. (2003). *İsitme engelli çocukların eğitimine giriş*. [Introduction to education for hearing impaired children]. Eskisehir: Anadolu Üniversitesi Yayınları, No.153
- Girgin, U. & Karasu, H. P. (2007). İşitsel/sozel yaklaşımla eğitim gören isitme engelli öğrencilerin yazılı anlatım becerilerinin değerlendirilmesi. [Assessment of written expression skills in hearing impaired students trained with the auditory/oral approach]. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 33, 146-156.
- Graves, D. H. (1983). *Writing: Teachers and children at work*. Portsmouth, NH: Heinemann Educational Books.
- Gormley, K. & Sarachan-Deily, B. (1987). Evaluating hearing-impaired students' writing: a practical approach. *The Volta Review*, 89(3), 157-170.
- ILA (International Language Association). Retrieved from <http://www.readwritethink.org/professional-development/strategy-guides/guided-writing-30685.html>
- Karasu, H. P. & Girgin, U. (2007). Kaynastırmadaki isitme engelli çocukların yazılı anlatım becerilerinin değerlendirilmesi [Assessment of writing skills of hearing impaired students who attend mainstream Classes]. *Anadolu Üniversitesi Sosyal Bilimler Dergisi*, 7(1), 467-488.

- Karasu, H. P. (2014). Isitme yetersizligi olan ogrencilerin yazılı urunleri gozden gecirme ve duzeltme evresine duydukları ihtiyacın belirlenmesi [Determination of hearing-impaired students' requirements for editing and revision of written texts]. *Kuram ve Uygulamada Egitim Bilimleri*, 14(3), 1089-1109.
- Karasu, G., Girgin, U., Uzuner, Y. & Kaya, Z. (2012). Isitme engelli universite ogrencilerine uygulanan tanimlama yapma stratejisinin incelenmesi [An examination of defining strategy applied to hearing impaired college students]. *Anadolu Journal of Educational Sciences International*. 2(1):19-41.
- Karasu, G. & Uzuner, Y. (2018). Isitme engelli universite ogrencileriyle dengeli okuma yazma yaklasımı ile gerceklestirilen yazma calısmalarının incelenmesi [examination of hearing-impaired collage students' writing studies based on Balanced Literacy Instruction Approach]. *Ankara Universitesi Egitim Bilimleri Fakultesi Ozel Egitim Dergisi*, 19(2), 199-232. doi: 10.21565/ozelegitimdergisi. 310350
- Karasu, G., Uzuner, Y. & Beral, A. (2018). Isitme engelli universite ogrencilerinin yazma surecinde uygulanan etkinlik ve stratejilerin incelenmesi (Examining activities an strategies used in the writing process by hearing-impaired college students)*Ege Egitim Dergisi / Ege Journal of Education*, 19(1), 262-283. doi: 10.12984/egeefd.343127
- Kaya, Z. (2012). Isitme engelli yuksekokul ogrencilerine bilgisayar yazılımı kullanımının ogretilmesi: Eylem arastırması [An examination of instruction to hearing impaired college students: an action research] (Unpublished doktarate thesis, Anadolu University, Institute of Educational Sciences, Eskisehir, Turkey). Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>. (Thesis Number 312593)
- Klecan-Aker, J. & Blondeau, R. (1990). An Examination of the Written Stories of Hearing-Impaired School-Age Children. *The Volta Review*. 92(6), 75-282.
- KNILT, (2011). The Knowledge Network for Innovations in Learning and Teaching. Retrieved from http://tccl.rit.albany.edu/knilt/index.php/Unit_1:_What_is_and_why_use_action_research
- Kretchmer, R. R., & Kretchmer, L. W. (1978). *Language development and intervention with the hearing impaired*. Baltimore, Maryland: University Park Press.
- Livingstone, S. (1989). Revision strategies of deaf students writers. *American Annals of Deaf*. 134(1) 21-26.
- Luckner, J. L. & Cooke, C. (2010). A Summary of the Vocabulary Resarch With Who Are Deaf or Hard of Hearing. *American Annals of the Deaf*, Spring, 155(1), 38-67.
- Marschark, M., Lang, H. G., & Albertini, J. A. (2002). *Educating deaf students*. New York: Oxford University Press.
- Mayer, C. (2010). The Oxford handbook of deaf studies, language, and education. In M. Marschark & P. Spencer (Eds.), *The demands of writing and the deaf writer* (pp. 144-155). New York: Oxford University Press.
- Paul, V. P. (1998). *Literacy and deafness: The development of reading, writing and literate thought*. Boston: Allyn and Bacon.
- Pressley, M., Roehrig., A., Bogner, K., Raphael, L. M., & Dolezal, S. (2002). Balanced literacy instruction. *Focus on Exceptional Children*, 34(5), 1-14.
- Richards, J. C., & Renandya, W. A. (2008). *Methodology in language teaching: An anthology of current practice*. Newyork: Cambridge Universtiy Press.
- Rupley, W. H., Blair, T. R., & Nichols, W. D. (2009). Effective reading instruction for struggling readers: The rule of direct/explicit teaching. *Reading ve Writing Quarterly*, 25, 125-138. doi:10.1080/10573560802683523
- Schirmer, B. R. (2000). *Language and literacy development in children who are deaf*. Boston, MA: Allyn and Bacon.
- Strasmann, B. K. & O'Dell, K. (2012).Using open coptions to revise writing in digital stories composed by d/d deaf and hard of hearing students. *Ammerican Annals of Deaf*. 157(4). 340-357.
- Tompkins, G. E. (2000). *Teaching writing: Balancing process and product*. Upper Saddle River, New Jersey. Merril Publishing Company.
- Tompkins, G. E. (2007). *Literacy for the 21st century, teaching reading and writing in prekindergarten through Grade 4*. New Jersey Columbus, Ohio. Merril Prentice-Hall.
- Tiryaki, E. N. (2014). Ortaokulda ogrenim goren isitme engelli ogrencilerin yazılı metinlerini olusturmadaki sorunları. *Ana Dili Egitimi Dergisi*, 2(3), 101- 121.
- Tuncay, H. (1980). Isitme ozurlu cocukların yazılı anlatım yeterlikleri [Written expression competencies of hearing-impaired children]. (Unpublished master thesis, Ankara University, Faculty of Education, Ankara, Turkey). Retrieved from <https://tez.yok.gov.tr/UlusalTezMerkezi>.
- Truax, R.R. (1985). Linking research to teaching to facilitate reading-writing-communication connections. *The Volta Review*, 87, 155-169.
- Uzuner, Y. (2007). The impact of strategies used in the Blanced Literacy Approach on story grammar acquisitionof three Turkish students with hearing loss: An action study. *Deafness and Education International*. 9(1), 24-44.
- Uzuner, Y., Girgin, U., Kaya, Z., Karasu, G., Girgin, M. C., Erdiken, B. et. al. (2011). Isitme engelli genclere uygulanan Dengeli Okuma Yazma Modeli'nin incelenmesi [An Examination of Balanced Literacy

- Instructional Model Implemented to Youths with Hearing Loss]. *Kuram ve Uygulamada Egitim Bilimleri*, 11(4), 2111-2134.
- Vostal, R. Brooks, & Ward, M. S. (2015). Adapting self-regulated strategy developmetn in persuasive writing for adolescents who are deaf or hard of hearing. *The Clearing House*, 88.161-165. doi: 10.1080/00098655.2015.1065785
- Wolbers, K., A. (2008) Using Balanced and Interactive Writing Instruction to improve the higher order and lower order writing skills of deaf students. *Journal of Deaf Studies and Deaf Education*, 13(2), 257-277. doi: 10.1093/deafed/enm052
- Wolbers, K. A., Dostal, H. M. & Bowers, L. M. (2011). 'I was born full deaf.' Written language outcomes after 1 year of Strategic an Interactive Writing Instruction. *The Journal of Deaf Studies and Deaf Education*, 17(1), 19-38. doi: 10.1093/deafed/enr018
- Yoshinaga-Itano, C., Snyder, L. S. & Mayberry, R. (1996). How do deaf and normally hearing students convey meaning within and between written sentences. *Volta Review*, 98, 3-38.
- Yuknis, C. (2014). A Grounded Theory of text revision processes used by young adolescents who are deaf. *Council for Exceptional Children*. 80(3), 307-322. doi: 10.1177/ 0014402914522426

Role Of Need Satisfaction In Determining The Level Of Trait Anxiety Of University Student-Athletes

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Abstract

The primary purpose of this study is to examine the role of level of need satisfaction in prediction the level of trait anxiety of the athletes participating in inter-university sports competitions. The secondary purpose of the study is to examine the level of need satisfaction and trait anxiety of university student-athletes in the context of gender variable. For this purpose, a total of 217 athletes, 116 men (agemean = 21.88 ± 2.79) and 101 women (agemean = 21.06 ± 1.73), who participated in interuniversity sports competitions, voluntarily participated in this research. Basic Psychological Needs Scale and State-Trait Anxiety Inventory were used to fulfill the purpose of the study. In the analysis of the data, t-test, Pearson's correlation test and regression tests were used. The data were analyzed with the SPSS 21.0 package program and 0.05 was used as significance level. There was a statistically significant negative correlation between psychological needs satisfaction and trait anxiety levels of the athletes according to the obtained data. As a result, it can be concluded that autonomy and competence subscales of psychological needs satisfaction of the athletes participating in the research are a predictor of the level of trait anxiety.

Keywords: *Motivational Self Talk, Mental Toughness, friend support, Athlete*

Introduction

Researches performed in different sub-disciplines of sports science address the physical characteristics (Turna & Kılınç, 2018; Akyüz et al., 2018;) or psychological skills (Bayköse et al., 2016; Şahin, Bayköse & Civar Yavuz, 2017a; Bayköse & Civar Yavuz, 2017b; Bayköse et al., 2017; Nergiz, Bayköse & Yildiz, 2015) which influence or which could influence the performance of the athlete. Studies in sports psychology which is a sub-field of sports science gradually increase and it may be stated that effort is paid for understanding psychology of all individuals' in sports environments and also researchers have been trying to contribute science based on theory. In this context, the aim of the present study is to investigate the association between psychological needs and trait anxiety level of athletes based on self-determination theory (SDT) which was developed for motivation.

Basic psychological needs are addressed in the context of three main factors in self-determination theory (SDT). These three factors defined as competence, autonomy and relatedness are accepted as universal according to self-determination theory (Deci & Ryan, 1985; Deci & Ryan, 2000; Deci & Ryan, 2012).

Self-determination theory has begun with internal motivation studies at the beginning of 70s (Deci, 1971) and it is a motivation and personality theory which has been developed since then and supported by many empirical studies (for detailed information, please see Deci & Ryan, 2012, Vansteenkiste, Niemiec & Soenens, 2010). Self-determination theory hypothesizes that human's nature has the potential to develop and reach its potential however social and environmental factors could inhibit (or support) this tendency (Ryan & Deci, 2002). Self-determination theory is composed of five different sub-theories. Autonomy, competence and relatedness needs are the basic psychological needs which are required for psychological health and personal development (Deci ve Ryan, 2000). Just as a seed's growing and developing require air, soil and water, wellness and satisfaction of these three needs are required for psychological development of humans.

Competence is one's feeling him/herself competent and sufficient in his/her doings and interactions. Significance of competence feeling was addressed in social cognition theory of Bandura (1986). According to self-determination theory, the activities which satisfy competence need are the ones which provide most appropriate challenge for developing the capacities of individuals (Ryan ve Deci, 2002).

Relatedness is defined as being in relation with others safely and heartfelt. Other theories like socio-meter theory (Baumeister & Leary, 1995) or attachment theory (Bowlby, 1979) have also revealed that sense of belonging is a basic need. According to self-determination theory, relatedness need can be satisfied through feeling oneself to belong to the community with respect to psychological aspect but not through statue or position.

Autonomy is defined as selecting the actions through his/her own willpower or selection and their being consistent with one's self. The opposite includes the behaviors done under pressure. It is not possible to state about self-determination or a real autonomy if a behavior is not internalized in harmony with one's self. Although competence and relatedness help to internalize the behaviors at some degree, a behavior cannot be healthily internalized to self without autonomy (Deci & Ryan, 2000). So satisfaction of autonomy plays a more important role than the other

needs according to self-determination theory, and the environments which satisfy this need provides a healthier development for the person.

Worry (anxiety) may be defined as a worry feeling against a non-physical threat. It is evaluated as one of the important mental health problems as it is common and may precipitate some mental diseases (Yeniçeri et al., 2007). Some authors report that a moderate stress and worry could improve creativity and development of people however increased anxiety could lead to decreased attention, focusing and learning, making errors, impaired interpersonal relationship, reduced productivity in presence of intensive stress (Yeniçeri et al., 2007).

Studies conducted in our country are required. Athletes begin to take responsibility through making selections, get in contact with new environments and try to develop themselves. The main purpose of the present study is to investigate how satisfaction of basic psychological needs predict trait anxiety level in the context of stress and psychological needs relationship.

Method

Study design

The present study is a relational screening model which aims at determination of presence or degree of covariance between two or more variables.

Study group

The study was conducted with athletes who participated in sport competitions between universities in different braches (volleyball, football, basketball, wrestle etc.) during 2017-2018 seasons. A total of 217 athletes (116 males with mean age of 21.88 ± 2.79 years and 101 females with mean age of 21.06 ± 1.73 years) were voluntarily included in the study.

Data collection tools

Data were collected using personal data form, basic psychological needs satisfaction scale and state-trait anxiety inventory.

Need satisfaction scale (NSS)

Need satisfaction scale was developed by Deci and Ryan (1991) and adapted to Turkish by Bacanlı and Cihangir Çankaya (2003). It is 7 Likert type scale and evaluates 21 items which measure basic psychological needs. The scale is composed of three subscales as autonomy, competence and relatedness. Overall score of the scale and internal consistency coefficients of subscales were calculated with Cronbach alpha method on 250 students. Internal consistency coefficients of subscales were found as .71,.60 and .74, respectively and .83 in total. Correlation obtained with applying the scale with two week intervals was .89 and these values were .82, .80 and .81 for subscales, respectively. Item-total correlation values vary between .33 and .64. Consistency statistics which was obtained with confirmatory factor analysis were as follows: RMSEA: 0.07, GFI: 0.86, AGFI: 0.82, CFI: 0.82, NNFI: 0.80. Factor loads obtained from the scale vary between .30 and .77. T values obtained with discriminant validity vary between 3.964 and 11.454

State –trait anxiety inventory (STAI)

State –trait anxiety inventory was developed by Spielberg, Gorsuch and Lushene (1970) and adapted to Turkish by Öner and LeCompete (1983). Test-retest reliability is .73 and .86 for trait anxiety inventory,.16 and .54 for state anxiety inventory; KR-20 reliability is .86 and .92 for trait anxiety inventory, .83 and .92 for state anxiety inventory; median item-total reliability is .55 trait anxiety inventory, .54, .46,.53, respectively for state anxiety inventory. Trait anxiety sub-scale of the inventory was used in this study.

Data analysis

Skewness and Kurtosis values were tested for evaluating normality distribution. Skewness (0.593) and Kurtosis (-0.503) values of both scales were found between +1 and -1, in other words they were found to normally distributed and parametric test techniques were used. Descriptive statistics, frequency, percent, mean, t test, Pearson correlation test and multi-linear regression analysis were used for data analysis. SPSS 21.0 package program was used and a p level of <0.05 was taken as statistically significant.

Results

Table 1: Association between need satisfaction and trait anxiety level in university student athletes

	Relatedness	Autonomy	Competency	Trait anxiety
Relatedness	Pearson Correlation	1		
	Sig. (2-tailed)			

	N	217			
Autonomy	Pearson Correlation	,687**	1		
	Sig. (2-tailed)	,000			
	N	217	217		
Competency	Pearson Correlation	,544**	,543**	1	
	Sig. (2-tailed)	,000	,000		
	N	217	217	217	
Trait anxiety	Pearson Correlation	-,370**	-,485**	-,540**	1
	Sig. (2-tailed)	,000	,000	,000	
	N	217	217	217	217

** . Correlation is significant at the 0.01 level (2-tailed).

When correlation analysis findings were evaluated, trait anxiety level of university students was seen to have a negative correlation with need satisfaction. When level of negative correlations was analyzed, it may be stated that trait anxiety level of the athletes have a moderate association with autonomy and competency subscales of need satisfaction and a weak correlation with relatedness subscale.

Table 2: Regression analysis results about the role of need satisfaction on detecting trait anxiety level in university student athletes

Model	β	t	p
Autonomy	,306	-4,131	,000
Competency	,409	-6,028	,000
Relatedness	,074	1,035	,332

R=0,589; R2=0,342; Adjusted R2=0,338; F(3,216)=37,687; p=0.000

Relatedness subscale of need satisfaction is seen not to be included in multi-step regression analysis model. According to multi-step regression analysis, a significant association was found between both autonomy and competency, and trait anxiety level (R=0,589; F=37,687; p < 0,01). While a negative and significant association was found between autonomy and trait anxiety level (β = 0,306; p<0,01), a negative and significant association was found between competency and trait anxiety level, too (β = 0,409; p<0,05). Autonomy and competency scores explain 34.2% of overall variance about trait anxiety level (R²=0,342; p<0,01).

Conclusions

The present study has investigated the predictive role of need satisfaction level on trait anxiety level. Autonomy and competency were detected to negatively predicted trait anxiety. Results of the study have revealed that the increase in autonomy level of the athletes has led to a decrease in trait anxiety level, a decrease in autonomy level has led to an increase in trait anxiety level. The same was observed for also competency.

Sarı et al. (2011) have reported a negative and moderate correlation between need satisfaction and trait anxiety, consistently with our study. It may be stated that satisfaction of basic psychological needs could lead to a decrease in trait anxiety as also stated by Sarı et al. Results of the study of Harrison et al. (1997) are also in parallel with ours. In another study, Mellanby & Zimdars (2011) report a negative correlation between trait anxiety and autonomy.

Consequently, although relational studies provide more information about causality between variables, it is not possible to test causality with that type of designs. Interventional studies which include control group or experimental studies would yield more clear data about autonomy support and trait anxiety. Results of our study significantly contribute to literature despite these limitations. Although autonomy support and self-determination theory have been applied in many context, they were not studied yet in athletes in trait anxiety context. This is the first study in that field. Results support self-determination theory and contribute to literature.

References

- Akyüz, Ö., Işıldak, K., Taş, M., Akyüz, M., & Turna, B. (2018). Investigation Of The Relation Of The Leg Volume To The Anaerobic Power Values In The Elite Swimmers. *European Journal of Physical Education and Sport Science*. Vol:4, 57-64.
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Englewood Cliffs, NJ: PrenticeHall.
- Baumeister R. ve Leary, M. R. (1995). The need to belong: desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117, 497-529.
- Bayköse, N., Civar Yavuz, S., Çoban, M., Şahan, H., & Certel, Z. (2016). Role of self talk in prediction of passion level in physical education class environment. *Turkish Online Journal of Educational Technology*, 2016(DecemberSpecialIssue), 445-452.
- Bayköse, N., Civar Yavuz, S., Özer, Ö., & Şahin, A. (2017). The role of self-talk and self-efficacy levels of athletes studying at faculties of sport sciences on predicting mental toughness. *Turkish Online Journal of Educational Technology*, 2017(December Special Issue), 591-595.
- Bowlby, J. (1979). *The making and breaking of affectional bonds*. London: Tavistock.
- Deci, E. L. (1971). Effects of externally mediated rewards on intrinsic motivation. *Journal of Personality and Social Psychology*, 18, 105-115.
- Deci, E. L. ve Ryan, R. M. (1985). *Intrinsic motivation and selfdetermination in human behavior*. New York: Plenum.
- Deci, E. L. ve Ryan, R. M. (2000). The “what” and “why” of goal pursuits: Human needs and the self-determination of behavior. *Psychological Inquiry*, 11, 227-268.
- Deci, E. L. ve Ryan, R. M. (2012). Self-determination theory. P. A. M. Van Lange, A. W. Kruglanski ve E. T. Higgins, (Ed.), *Handbook of theories of social psychology: Vol. 1 içinde* (416-437). Thousand Oaks, CA: Sage.
- Harrison, A. W., Rainer, R. K., Jr., Hochwarter, W. A., and Thompson, K. R., (1997). “Testing the self efficacy-performance linkage of social-cognitive theory”, *Journal of Social Psychology*, 137(1), pp.79–87.
- Mellanby, J., Zimdars, A., (2011). “Trait anxiety and final degree performance at the University of Oxford”, *The International Journal of Higher Education and Educational Planning*, 61(4), p357-370.
- Nergiz S., Bayköse N., Yıldız M. (2015). Kendinle Konuşma: Modern ve Halk Dansları Yapan Bireylerin Kendileriyle Konuşma Durumları. *Niğde University Journal of Physical Education And Sport Sciences*, 9, 40-49
- Şahin, A., Bayköse, N., & Civar Yavuz, S. (2017a). Does the undergraduate athletes’ self talk levels affect imagery levels?. *Turkish Online Journal of Educational Technology*, 2017(December Special Issue), 867- 871.
- Şahin, A., Bayköse, N., & Civar Yavuz, S. (2017b). The role of motivational self-talk and life satisfaction on determining the flow experience of undergraduate athletes. *Turkish Online Journal of Educational Technology* (December Special Issue), 867-871.
- Sarı, İ., Yenigün, Ö. Altıncı, E.E. & Öztürk, A. (2011). Temel Psikolojik İhtiyaçların Tatmininin Genel Öz Yeterlik Ve Sürekli Kaygı Üzerine Etkisi (Sakarya Üniversitesi Spor Yöneticiliği Bölümü Örneği). *SPORMETRE Beden Eğitimi ve Spor Bilimleri Dergisi*, IX (4) 149-156
- Turna, B., & Kılınç, F. (2018). Comparison of some Biomotoric Properties and Anthropometric Measurements of Male Basketball and Football Players. *Journal of Education and Training Studies*, 6(5), 118-122.
- Vansteenkiste, M., Niemiec, C. P. ve Soenens, B. (2010). The development of the five mini-theories of self-determination theory: An historical overview, emerging trends, and future directions. T. C. Urdan ve S. A. Karabenick, (Ed.), *Advances in motivation and achievement*, v. 16A—The decade ahead: Theoretical perspectives on motivation and achievement içinde (105-165). London: Emerald Group Publishing Limited.
- Yeniçeri, N., Mevsim, V., Özçakar, N., Özcan, S., Güldal, D., & Başak, O. (2007). Tıp eğitimi son sınıf öğrencilerinin gelecek meslek yaşamları ile ilgili yaşadıkları anksiyete ile sürekli anksiyetelerinin karşılaştırılması. *Dokuz Eylül Üniversitesi Tıp Fakültesi Dergisi*, 21(1), 19-24.

Sacral And Spiritual Landscape Perception In South Moravian And Ústecký Region: Application In Environmental Learning

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Abstract

The contribution aims to study the perception of the sacral landscape and spiritual places in the South Moravian Region (especially the city of Brno) and Ústecký Region, i.e. in those areas which are ranked among the most and the least religious within the Czech Republic. The main purpose is to explore the landscape perception from the viewpoint of university students in both regions – with the focus on their spiritual imagery and preferences related to concrete places. The second aim is to point how we include these findings in the university courses at Masaryk University in Brno and J. E. Purkyně University in Ústí nad Labem. The paper discusses interrelated topics, which are linked with the landscape perception in South Moravian and Ústecký Region. The first theme is the sacral landscape associated with the perception of spiritual and personally important places; then the intention is to approximate the perception of sacral and spiritual elements of the landscape such as churches, chapels, forests, elevated places in the landscape and roadside memorials; third aim is to show how it works in the courses Sustainability, Urban and Rural studies and International Geographical Research. A questionnaire survey has been used to explore the spiritual attitudes of young people studying geography in Ústí nad Labem and Brno. The results point out the specific spiritual attitudes towards generally natural spaces and places assuming the condition of very low declared religiosity (in Ústecký Region) and provide an overview of the places and feelings associated with them; on the contrary relatively high religiosity and abundance of sacral and spiritual places in South Moravian Region were discussed. The results also point to the specific and relatively significant spiritual perception of certain landscape elements by young people which act in the cities of Brno and Ústí nad Labem. The application of mentioned concepts in the university education is also included.

Introduction

Landscape is an important component of the living space that is inhabited by every living being of this planet. The beginnings of modern attempts to grasp its complexity can be found at the end of the 18th century with Alexander von Humboldt; according to Lipský (1998), von Humboldt described the landscape as "the total character of the territory" (Totalcharakter der Erdgegend). Forman and Godron (1993) in their Landscape Ecology define the landscape as a heterogeneous part of the territory, consisting of a cluster of interacting ecosystems that repeat themselves in similar clusters within several kilometres wide area. According to Lipský (1998), the Dutch School views the landscape as a complex of higher order systems that interact with each other. These systems are by their nature an inseparable part of the Earth's surface and the whole set is formed and maintained by the continuous activity of abiotic, biotic and anthropogenic factors. Emphasis is placed on three aspects: perception, horizontal and vertical landscape structure - see also Stibral & Faktorová (2015). Anthropogenic relationships and influences play an important role in these landscape systems. The long-term effects of these influences are described by Stibral & Faktorová (2015), who, among other things, explain the formation of the landscape concept from the Renaissance period, including its reflection in painting and literary creations. Schama (2007) deals broadly with landscape study from the social science point of view. He primarily perceives the landscape as a cultural phenomenon (similarly to Cosgrove 1993, Wylie 2007); however, the inclusion of the sacral landscape purely according to anthropogenic influence is problematic (Zonneveld 1995, Forman and Godron 1986, Lipský 1998). The aspect of culture and lifestyle is indisputable; the sacral landscape can be found in the rural environment, for example, in the form of scattered Baroque architecture (Havlíček 2011), but also in cities where we can encounter various influences of sacral objects on the life of individuals, in heavily urbanized areas (Novotný & Daněk 2017). The aesthetic function of these objects can also be important (Havlíček & Hupková 2008), on the other hand, for the believers, it is mainly used as regular meetings spaces or "technical places" for religious practice (Novotný 2017). There are also sacral sites that are located in an environment close to the nature, if we use the first part of

the Zonneveld (1995) classification for landscape status description. It may be more remote places of pilgrimage, other little shrines, but also "sacred places" existing for centuries.

Why do people constantly turn to nature, when on the other hand, they are building "artificial" temples, such as churches in the city? The whole concept of landscape perception was influenced by religion and biblical interpretation of the creation and historical development of the world, a positive reputation of wild landscape acquired with the advent of Romanticism (Stibral 2005). Prior to Romanticism arrival, the views of the population were greatly influenced by religious paradigms: in particular, the effort to create a "terrestrial paradise" - the perfect landscape, and thus to come closer to an ideal landscape which God previously created in the Bible. The change comes slowly and gradually by promotion of natural elements within landscape paintings, as well as architectures, for example the extensive construction of castle gardens and ornamental buildings or landscaping of unpaved swampy soil, which could be found in the Italian region of Veneto in early modern times (Cosgrove 1993). The return of artists to the elements of ancient culture was also significant (Ovidius, Vergilius). The archetype of the Arcadian landscape was recreated thanks to the cultural movements of Renaissance and Romanticism. This landscape type showed an ideal forest-land type with plenty of food, wide view and shelter (Cosgrove 1998, Stibral 2005). It also included ancient elements, such as mythical creatures or temples. At the same time, thanks to its popularity, this type of landscape became the starting point for the next generation of artists, which were interested in landscape paintings and sacred sources. Eliade (In Relph 1976: 15) believes that sacred experience involves the "manifestation of something of a wholly different order, something that does not belong to our world". Such experience obviously has profound existential significance – above all it provides orientation by reference to holy or sacred places. Sacred places are centres of the world – points at which the three cosmic planes of heaven, earth and hell are in the contact and where communication between them is possible. Such centres are in no way to be understood as geometric and indeed there may be an infinite number of sacred centres in any region all of which are considered and even literally called "the centre of the world" (Eliade In Relph 1976: 16). Thus each temple, each place, each hallowed area and even each house insofar as it is itself a temple, constitutes a sacred place (Raglan 1964). Modern artists were also, since the beginning of the 20th century, focused on specific work with space and the environment, to help highlight and reflect the unique relationship between man and place (e.g. specific art, land art) (Šiler 2017).

Civil groups and individuals are currently engaged in the rescue and repair of thousands of small sacral monuments scattered throughout our country (Šiler 2017). Not to pray at them - as the Poles have done so often – but so that these sacred spaces and artefacts, by their simple silent existence, have rhythmized the area of the city and carried out the cultural acupuncture of the landscape (Šiler 2017). The contemporary reconstruction of sacral objects is not predominantly conditioned by religious motives (Havlíček 2011).

As part of the perception of the landscape and its further use, for example, for tourism or recreation, the concept of scenic roads was formed in the USA during the 20th century. It is based on a combination of automobile and sightseeing routes, to show the beauty of the surrounding landscape (see, for example, Bobr & Riezner 2017, Bobr & Novotný 2018, US Department of Transportation 2018). The purpose was to make use of less frequent roads and encourage the development of economy alongside them. Designed roads must have at least one of six qualities, such as archaeological, cultural, historical, natural, recreational or scenic value (Bobr & Riezner 2017). The scenic roads theme could be linked to sacral sites through roadside memorials, i.e. memorials to victims of traffic accidents (Hartig & Dunn 1998, Nešporová 2013, Nešporová & Stahl 2014, Przybylska 2015).

According to Forman & Godron (1993) the perception of the landscape depends on the viewer's point of view. This is a human individual for in our case of study (the research question focuses on the perception of the landscape by the inhabitants of the South Moravian and the Ústecký regions, more precisely by young respondents aged 20–30 years, we are especially interested in the lower end of this spectrum - see 2. The Study / Methods). The research problem is focused on the perception of the key sacral elements of the South Moravian and the Ústecký regions, but it also aims at the imagery and the experience of the personal sacred places that respondents create in the space which they inhabit.

The aim of this text is to study the perception of the landscape through the eyes of young people in the South Moravian and Ústecký Regions – and to do so we use three main themes that are interconnected. Within the framework of the aforementioned concept of a sacral landscape, it is intended to bring closer look at the perception of spiritual and personally important places (if such sites exist for the participants of the research), which are not always associated with ecclesiastical objects in the landscape. Our assumption was on the contrary, we presume that within the framework of secularization trends, it is more about other places which will be more directly related to nature. The partial aim was to identify these spiritual places and their significance for the present young generation, including the assessment of important historical places and landmarks in Brno and Ústí nad Labem

and surroundings of these cities. The second aim is to assess perceptions and differences in the perception of partial sacral and spiritual elements of the landscape, such as churches, chapels, forests, elevated places in the landscape, as well as memorial sites serving as memorials to victims of traffic accidents. The third objective lies in the didactic purposes: to approximate the context on which this research is based. The main context is university education at two Departments of Geography in the Czech Republic: in Brno and Ústí nad Labem. These cities were chosen because they act as catchment areas for university education in the South Moravian and Ústecký regions. Specifically it is taught in following training courses on aforementioned universities: course of *Sustainability* and the *Urban and Rural Studies* (both at Masaryk University in Brno, taught in the period 2014-2017), both originally introduced by doc. Alois Hynek, and *International Geographic Research* at the University of J. E. Purkyně in Ústí nad Labem since 2017.

In the frame of our didactic methods we use the division of the key concepts in Geography (see also Hynek et al. 2016) or the Sustainability concept as presented e. g. by Whitehead (In Cloke et al. 2014) in the Third edition of *Introducing Human Geographies*. Sustainability, also commented as sustainable development, is an integrated concept which includes three main pillars: the environment, the economy and the society. The environment is represented basically by ecological systems, biological metabolism, source use, etc.; the economy is characterized by financial flows, employment, production process or patterns of consumption; the society is based on living, reproduction, quality of life, health or the issue of the human rights (Whitehead in Cloke et al. 2014). Teaching Sustainability at the Masaryk University of Brno (since Autumn Semester of 2014 up to 2017, with the cooperation with A. Hynek) meant following outline of the course:

- a) Study on Lower Svitava Basin – near Brno
 - 1) rural landscapes
 - 2) urban landscapes
- b) Lectures and complementing seminars on:
 - 1) natural and social capital
 - 2) hybridity and nexus
 - 3) virtual walk along the Svitava river in Brno

The culture lies among three sustainability pillars and it is represented in the space by the cultural landscape. The cultural landscape is created by different people with disparate habits and intentions in different places – material culture is determined by the process of transformation of the environment (Sauer 1963, Hynek 2011). Landscape is product of collective endeavour, it reflects ideas, power and technologies; it is shaped by social organization, it has its own choreography – the processes produce disparate forms (shapes); cultural landscape is the space of nature and human interactions (Sauer 1963, Hynek 2011). Landscape is also a visual image of cultural meanings (Wylie 2007). The analysis of the landscape should include discourses or the systems of language and written studies which are included in the production, representation and interpretation of these landscapes (Cosgrove 1993).

Practical terrain research focused on the perception and cognitive understanding of selected localities. Sustainability – in the frame of this concept the cores of the practical research according to our teaching can consist in (see also Hynek et al. 2016): Land use; Labour, land and capital; Technical and social infrastructure; Divergencies (landscape continuum or so called urban-rural nexus – Gondek 2014); Transport, waste and pollution; Biodiversity; Security questions – ‘safety’ and ‘security’; Agents, actants. Decision makers, stakeholders, shareholders; brownfields– what about their future usage?; Factories and business companies – their environmental policy; Flood risks; Other many possibilities of terrain research.

We also encourage our students to create their own “mental maps” of different areas of study (e. g. surroundings of Brno, urban landscape of cities Brno and Ústí nad Labem), followed by discussion of the natural and social capital placing emphasis on the perception (Hády quarry, Těsnohlídek Valley etc.) and/or the application of the sense of place concept (Tuan 1974, 1977). Interviews and participant observations are the crucial methods of geographical inquiry we try to teach our students as well.

There is also a concept of the scenic roads which is primarily possible to be included into the category of drive tourism or tourism in general (Hardy 2006). For teaching, this concept is a way to get familiar with your region or state. The theme is also applicable for fieldwork or seminar work at universities or lower grade schools. Here there is more space for pupils' own creativity, such as defining important elements in a region or state. These places then form the central points that will result in the scenic road designation. Here there is the opportunity to point out the natural and cultural specifics of each country and to adjust the route choice to them. The final result of this scenic road planning exercise can be the student presentation of the designated scenic roads and the defence of the reasons for their selection.

The Study

Typical quantitative methods were utilized, namely a questionnaire survey, conducted according to the typical methods of creation and evaluation of the questionnaire (Cloke et al. 2004, Disman 2008, Punch 2008). There were three main themes of the inquiry related to the aim of this contribution: 1) general perception of spiritual and personal places in the landscape, 2) attitudes towards concrete sacral and spiritual elements of the landscape 3) application in the university education and environmental sciences. This was a pilot research, created to provide answers of the representative sample of a certain population group (the students of Departments of Geography of the Faculties of Science at UJEP in Ústí nad Labem and MU in Brno); after evaluating the results, the other purpose was to specify, to “soften” (see Hendl 2005) or redefine themes and particular questions. Subsequent research then can be developed in more manners, basically a) to continue with a vast quantitative survey with the aim to collect opinions of broader layers of inhabitants of both examined regions, b) a qualitative survey with limited number of selected respondents, but with the use of thorough semi-structured interviews and standard methods of selection of the communication partners like e. g. the method of the snowballing (Cloke et al. 2004) or the technique of the grounded theory (Strauss & Corbin 1999). The reason to opt for our sample of respondents also laid in the attempt to continue with the research on religious and spiritual imagery of young people (Hopkins 2015, Novotný 2017, Novotný & Daněk 2017, Bobr & Novotný 2018), with the focus on Ústecký Region, which is traditionally rated as one of the least religious regions of the Czech Republic according to statistical data (see e. g. ČSÚ 2014); and immediately after evaluating this part of survey, to aim at the Brno Region, to construct a comparison, between other results, because this territory is part of traditionally more religious South Moravian Region (Lužný & Nešpor 2008, ČSÚ 2014, Nešpor & Vojtíšek 2015).

The questionnaire survey was conducted in Ústí nad Labem in March of 2018, subsequently in Brno in the month of June of the same year. In Ústí nad Labem the questionnaires were distributed in the lectures, including all present students of all years and specializations of Geography in Ústí nad Labem; in the case of Brno the survey was done via online questionnaires in the interface of Google Docs (in June the courses had already ended). The answers of 93 respondents were collected in Ústí nad Labem, with 63% of men (59 persons) and 37% women (34 persons); in Brno 100 respondents participated in the survey (51 men and 49 women). The average age of all respondents in Ústí nad Labem was 22,3 years; in Brno the average age was 23,7, however, it was influenced by some extreme values (Ph.D. students exceptionally up to the age of 39 years). However, the modus (the most frequent value) for Brno was 22 years of age. Many respondents live in Ústí nad Labem or Brno or in the close surroundings of mentioned cities, but others inhabit Brno and Ústí nad Labem just temporarily or commute from localities outside the defined regions of Ústí and Brno (see below), thus a specific amalgam of personal and spiritual important places was created. These were mainly sacral places, selected churches and other monuments, but also places which can be related to the national landscapes (see e. g. Nairn 1997), or places constituted by hills and mountains (Milešovka, Buková Mountain near Zubrnice, Malé Sedlo in the city district of Střekov, then selected lookouts and altitude points in the surroundings of Brno, like the view from the Hády quarry, Babí Lom, Klucanina or Čebínka lookouts).

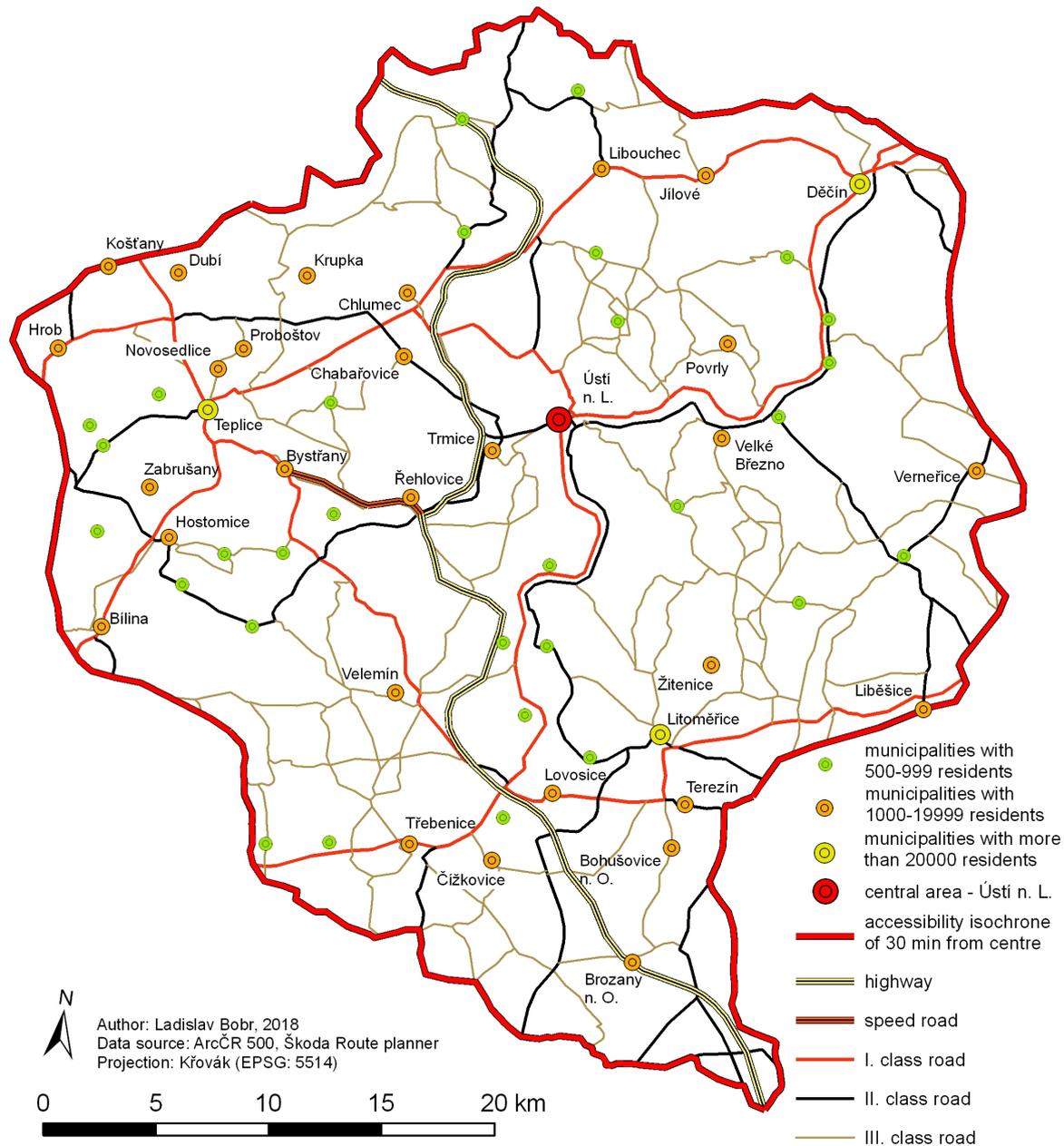


Figure 1: Ústí Region defined by average time accessibility isochrone (30 minutes) by car from the central location (Ústí nad Labem)

The introductory part of the questionnaire concerned the imagery of spiritual places and expression of the personal connection to the sacral landscape. Consequently, the concrete places of respondents' spiritual importance were determined, based on the maps of Ústí Region and Brno Region (Figure 1, Figure 2). These regions were understood as territories delimited by average time accessibility isochrone (30 minutes) by car from the central location (Ústí nad Labem or Brno, using the application Škoda Route Planner (Škoda Plánovač cest 2018)). The account of selected sacral and spiritual places in Ústí and Brno Region did not necessarily include only "material" churches and chapels, but also forest complexes, caves, viewpoints in the landscape etc. The perception of the places had been evaluated on the scale from 0 to 5 and after closing the research, the resulting score of selected localities was defined. The respondents also had the opportunity to express which spiritual and personally important places were missing in this part of the questionnaire.

In the phase of Ústí nad Labem also the more focused querying regarding the importance of surrounding landscape during the commuting to school or employment (vacation, eventually) was carried out; in compliance with the scenic roads concept (Mauch & Zeller 2008, Bobr & Riezner 2017, U. S. Department of Transportation 2018), this part of the research was already published (Bobr & Novotný 2018); the results on the scenic roads in Ústí Region

are not included in this text. The question of roadside memorials (erected to the memory of victims of traffic accidents) was intentionally projected to bridge the issue of scenic roads and particular evaluation of the sacral objects.

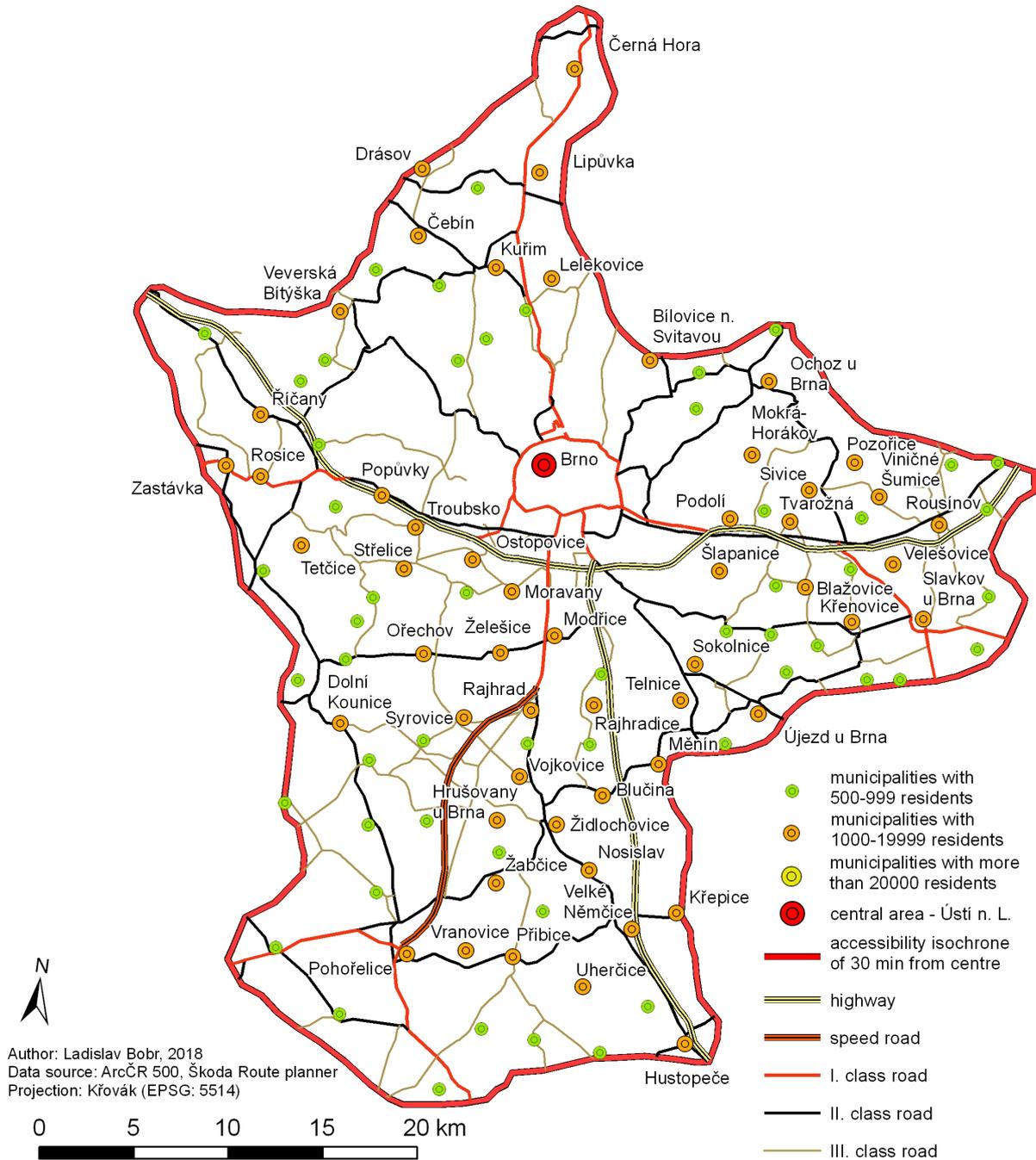


Figure 2: Brno Region defined by average time accessibility isochrone (30 minutes) by car from the central location (Brno)

Consequently, sacral and spiritual places, such as churches, chapels, crosses, stations of the cross or funeral areas were evaluated. Also the landscape perception was questioned, as well as the reflection of concrete feelings when observing the landscape from an elevated place.

As is usual, the final part of the questionnaire asked for common identification data, such as age, sex or the school-year of the respondents (keeping the anonymity, the name of the respondent was not required). An important question, and one of central questions, was about the self-identification of the student regarding their religious attitude, utilizing some predefined categories (non-believer; I believe in a higher power which I would not name God; I am Christian but I do not attend masses or any other spiritual meetings; I am Christian and an active member of the community, etc.). The respondents were allowed to introduce their own specific attitude, out of predefined

categories; this option was frequently used mainly by traditionally more religious (and/or spiritually oriented) students of the Department of Geography of Brno.

Findings

With regards to the sacral landscape and spiritual meaning, students from Ústí mostly state hills and mountains, such as the sites of lookouts (62 %). The second most important part of sacral landscape were pointed out to be churches and chapels (60 %) (it was possible to check more choices in the question). Little less than half of respondents (47 %) also matched forests to that meaning. Only about 34 % connects sacral objects, such as stone crosses and shrines, with any spiritual meanings. Funeral sites (cemeteries, graveyards, tombs, burial chambers, burial sites, necropolis) are mentioned sporadically in some answers, however there was no direct question for that kind of place. Historical sites (i.e. places with historical meaning) and water bodies (rivers, ponds, dams, lakes) are mentioned only rarely. In that context were also rarely mentioned places and spaces, where the person is surrounded by other people. People (crowd) provide spiritual power of the people or community to these places (i.e. people create place).

The answers of students from Brno are sharply different. The most important sacral places are considered to be churches and chapels (92 %), followed by stone crosses and shrines in the landscape (72 %). Elevated places with lookouts and forests are not considered to be much important (only 25 %, or 17 %). Funeral sites were asked for directly, and the result is their importance for 60 % of respondents. According to the answers, these places are mostly connected with their usefulness, importance for meditating, calmness and memory of the deceased. In the imagery of the respondents from Brno, the traditional perception is mostly used, according to which the Christian sacral elements are equal to general sacral elements. These results follow the proposition of higher religiosity of Brno respondents (which is shown by their perception of sacral places) and lower religiosity of Ústí respondents; according to statistics, the South Moravian Region is among the places with the highest religiosity (and with a high percentage of Christians), while the Ústí Region is among the less religious places. That is shown also by different perception of sacral places. The spirituality in Ústí region is mostly linked with natural spaces connected with spirituality and the sacral objects are only vaguely related to the creation and development of personal spirituality. In Brno region, as mentioned above, the spirituality is mostly connected to Christian sacral objects.

Particular places with (possible) spiritual importance for respondents are based on defined regions of Ústí and Brno (defined above; see part The Study / Methods). In Ústí region, the most frequently mentioned places were the surroundings of the place of home and further mountainous parts of the landscape. Their importance was partly for the physical landmark itself (easily found and dominant element of the landscape), partly for the lookout place; this supported the original hypothesis of including questions on spiritual aspects of lookouts as well. Among these should also be included rock structures (such as Tisá Walls or Marian Rock, a landmark in Ústí).

In Brno region, there was a stronger connection to the place of study, Brno itself. In the first, open student suggestion question, the Petrov cathedral (cathedral of St. Peter and St. Paul in the city core of Brno, one of important landmarks, shown also on one of the Czech coins) is mentioned most frequently. Another frequent place in Brno was St. James Church near the main square in the city core, or a common category “churches”. Particular churches were mentioned also in the region of Brno, e.g. monastic church in Rajhrad (south of Brno) and Vranov u Brna (north of Brno) or pilgrimage church in Křtiny (northeast of Brno). Important churches (in the sense of history or architecture) and pilgrimage places were mentioned also in a common meaning. On the other hand, the in Ústí frequently mentioned categories of high places and lookouts were almost excluded in Brno respondents’ answers. Some respondents identified sacral and spiritual places exclusively with Christianity; thus leading to answers in sense of “I am not a believer, I have no such places”. This also points out the usual confusion “spiritual/sacral means Christian”, which is quite common in the Czech Republic.

Table 1: Perception of connection between selected parts of landscape and personal spiritual life (%).

	Ústí	Brno
churches and chapels	60,2	91,9
(stone) crosses and shrines	34,4	77,8
forest	47,3	17,2
hills, mountains – points of lookouts	62,4	25,3
cemeteries and other funeral places	N/A	58,6
other place	21,5	11,0

Source: own research and processing

Results of the part of survey containing the score of personal importance of places in the Ústí region, happened to be influenced by respondents’ place of living. It is a result itself, however it probably urges to re-define and narrow

the study of spiritually connected places in urban and rural landscape. Two places in the Ústí region have a crucial role, no matter the respondents' place of living – Říp (mythical hill, key place in Czech origin myths), which itself is out of the region, but it is visible and easily identified due to its shape, and Terezín (town, former fortress and a place with the holocaust memorial). The survey score was 347 for Říp and 341 for Terezín, which are the highest values. Other notable places in Ústí region with high scores are: Milešovka (sharp cone shaped hill, regional landmark and place of free time activities; score 296), Tisá Walls (natural landmark, rock structures; score 286), Střekov Castle (natural and historical landmark in Ústí district Střekov, part of panorama above the Elbe river; score 263) and Větruše (natural and historical landmark with small castle on the hill above the confluence of Elbe and Bílina rivers, part of panorama of Ústí; score 241). These places are also both landmarks and very impressive lookouts.

On the other hand, two other lookouts with assumed importance were scored as less important. The main reason for their low score is probably bad accessibility. Lookout on top of Malé Sedlo hill (score 86) is placed in a rather peripheral area to Ústí and it is not much known. Erben's lookout above Ústí district Dobětice (hill with lookout and lookout tower; score 136) is an important landmark (sharp hill above the estate), however it is far from students' daily used areas. According to the survey, other less important places are Přemysl Oráč memorial in Stadice (also refers to Czech myths; score 124) and noticeable hill Buková hora near Zubrnice (score 130). These places with less personal and spiritual importance were substituted by specific hills, memorials, landmarks and places near respondents' places of living. It is possible that respondents were influenced by the previous question in the survey, which led to equalling of spiritually important place perception and "mere" landmark presence perception in place of living. The result of this equalling was a combination of personal influence, everyday or regular movement and local landmarks; spirituality was lost in this phase of research.

In Brno region, the Petrov cathedral in city centre of Brno (score 337) had the highest score. In Brno are also other important religious landmarks – St. James church (score 298) and The Augustinian Abbey (church and monastery) in Staré Brno (at the Mendlovo square; the abbey has been the home and workplace of scientist Johann Gregor Mendel. A special kind of spiritual place is the battlefield of The Battle of Austerlitz (score 211), which consists of several places (e.g. castle in Slavkov u Brna [originally Austerlitz], memorial at Zuran hill, several mass graves areas, etc.). The most important is probably The Peace Memorial near Prace, which is the first peace memorial in Europe. On the other side of Brno region (northwest of Brno) is Veverčí castle (score 204), built on the promontory above Svratka river (now above surface of Brno Dam) in a forestall area. Discussing the score of the latter two places, their importance probably lies in their tourist attractiveness and their aura of a place for pleasant experiences in general, not only in the spiritual sense. On the other hand, both of these places can be attractive for dark tourism fans.

As mentioned above, the places of lookouts in Brno region have surprisingly failed. The only exception is lookout tower at Babí lom hill (north of Brno; score 159). Other lookouts and lookout towers, such as Květnice hill above Tišnov (score 91), the rather well known Alexander's Lookout Tower above Adamov (score 80), Klucanina (above Tišnov; score 69), Čebínka (northwest of Brno; score 55), have rather low score. However, the popularity of Babí lom and Květnice may result from their natural and landscape importance, the exploration of which used to be a part of lessons in the Department of Geography. It is possible that high places in landscape are not as important as in Ústí region because of the type of relief. Mentioned high places in Brno region, which are meant to be widely known, are rather far from the core of the Brno urban region. As has been found out during years of teaching the courses "*Sustainability*" and "*Urban and Rural Studies*" at the Department of Geography in Brno, a lot of students have no interest in exploring nearer and further surroundings of their place of study. Their daily time-spatial routines are narrowed down to places of temporary living, study and several free time activities (e.g. sports ground, library, restaurants, pubs, clubs etc.). Similar behaviour is observed with students of the Department of Geography in Ústí, although their link to the Ústí region is stronger (but not with the city of Ústí itself). It may be caused by a stronger regional impact of Ústí Department, while students come to Brno from different regions of the Czech Republic, i.e. not only from the Brno region or the South Moravian region.

The next topic of survey was reverential places near roads, which emerge as the memorials of road accident victims. In general, results of survey did not confirm the thesis of Przybylska (2015), who stated a growing rejection of these roadside memorials. Ústí students seem to be permissive; most of respondents checked the answers "it is right, they [roadside memorials] are a useful warning and also road accident prevention" (78 % of respondents) and "it is right, they [roadside memorials] remind of the deceased person in a suitable way" (58 % of respondents). Among Brno respondents, the results were quite similar (63 %, or 45 %). It is possible to conclude, that young people are more accustomed to roadside memorials. They can feel compassion with their same-age peers, who are sometimes involved in these accidents as well. Results of this survey seemed to show an important field for further deeper research (e.g. via interviews; Cloke et al. 2004, Disman 2008).

It would also be incorrect to ignore the negative answers, although they are notably fewer. About 4 % of respondents both in Ústí and Brno do not like this kind of reverence in public space. Another portion of respondents consider the memorials as morbid (3 % for Ústí and 6 % for Brno). Partial comments for this topic show mostly the unsuitability of this kind of personal memorials in public space. One of respondents even advised the survivors should “put the headstone in their living room”. There were two other possible answers added in Brno part of survey (it ran after Ústí part). These answers were “I do not like them [roadside memorials], they often have low aesthetic quality” (12 %) and “I do not like them [roadside memorials], they distract the drivers” (5 %). Whole results are shown in Table 2.

Table 2: Perception of reverential places of road accident victims next to roads (e.g. crosses, memorials, flowers, candles etc.). Values in table in %.

	Ústí	Brno
it is right, they remind of the deceased person in a suitable way	58,1	45,0
it is right, but I do not perceive them	N/A	26,0
I do not like them, they do not fit into public space	4,3	4,0
I do not like them, they are morbid	3,2	6,0
I do not like them, they often have reduced aesthetic quality	N/A	12,0
it is right, they are a useful warning and also road accident prevention	78,5	63,0
no opinion	2,2	0,0

Source: own research and processing

The last topic of the survey focused on perception of specific (pre-defined) kinds of object and places, which are usually connected with religion or spiritual things. Categories were churches and chapels, crosses and shrines, Ways of Crosses and funeral sites. For each category possibilities of perception were set as “historical sites”, “spiritual places or places of calm”, “prominent landmarks”, “useless elements” and two other categories for other or no opinion.

For Ústí part, churches and chapels are perceived mostly as a historical landmark (92 %) and as a spiritual place or place of calm (68 %). Their perception as a prominent landmark is notably lower (29 %). On the other hand, almost no one marked them as useless elements, and the count of “no opinion” possibility was also very low (only about 5 %). Students from Ústí mostly state architecture, importance for tourism and sometimes also pleasant feelings as the positive attributes of these objects and their places. In some cases, negative attributes are stated as well; sometimes these places cause awkward feelings, disdain for religion (not mentioned whether only for Christian or religion in general), or feelings that “there is no business for an atheist in this place”. Among Brno students, churches and chapels are dominantly perceived as historical landmarks (89 %) and almost in the same way as spiritual places or places of calm (80 %). The perception as a prominent landmark is also lower (but not as much as in Ústí part; 55 %), while other possibilities take only marginal portion.

Crosses and shrines are perceived in a similar way. For Ústí part, most students see them as historical landmarks (58 %) and spiritual places (53 %). Interestingly, there is a relatively high portion of respondents who perceive them as the useless elements (13 %). For Brno part, the meaning of these objects as historical landmarks was noticeably lower than as spiritual places (52 %, or 60 %). They were also widely perceived as prominent landmarks (31 %), while their uselessness was distinctively lower (only 3 %). The question on Ways of Crosses was put only into Brno part of survey, where these objects were marked mostly as places of calm (63 %). The difference of perception of these places may be caused by different socio-cultural background of both regions. It is possible to tell the amount of these objects in both regions is similar. Their architecture and historical background are different – in Ústí region they were established mostly by German nationality and were strongly influenced by conventions of this community, while in Brno region the main driving force was Slav inhabitants (Moravians) and their conception of Christianity was rather different (partly because of strong Great Moravia influence). While the original inhabitants in Brno region remained, Ústí region underwent a great change because of resettlement of German inhabitants after World War II. (in Brno and in some parts of its region there were similar changes after World War II. Most of inhabitants of Brno core were German-speaking people as well. However, the change of culture was not as significant as in Ústí).

Views of landscape from some view point were in Ústí part perceived mostly as an aesthetical experience (87 % of respondents). It was also confirmed, that the calmness of the view can be related to spiritual life or spiritual feelings. Almost 30 % of respondents claim to experience unusual spiritual feelings and 11 % feel the presence of (some) supreme power. Among other feelings, there were quoted: peace, delight of climbing, overlooking the

landscape, insignificance of person compared to nature or an overall feeling of freedom. Results for Brno part were quite similar – 93 % of respondents perceive an aesthetical experience, 23 % feel the presence of supreme power and 18 % experience unusual spiritual feelings. These results also confirm the thesis of greater religiosity in Brno region. These results could also be a base of thesis of an extended spirituality. This spirituality has different presence in both regions; it is grounded in the traditional Christian religiosity in Brno region, but it proves to be a development of personal (individual) spirituality, with a very weak continuity to Christianity, in Ústí region.

The last part of survey contained a question on religious preferences of respondents (Table 3). These were put together with demographical and statistical questions. The Ústí Region has a long-term position as the least religious region of the Czech Republic (ČSÚ 2014). Nevertheless, it is rather surprising that only 3 students (3 %) stated a particular church (2 for Catholicism, 1 for Czech Brethren Evangelic Church). Only 9 % of respondents quoted affiliation with Christianity, but with no need to attend masses or other spiritual meetings. There was also an expectation of high share of people checking the possibility “I do believe in some supreme power, but I would not call that power *God*”. According to temporal surveys on religiosity in the Czech Republic, most people believe “in something”, which means in some transcendental power (Nešpor 2010, Václavík 2010, Štampach 2017). This discussed possibility was checked by almost 37 % of respondents, which leads to an opportunity for further research of religious or quasi-religious stances of (not only young) inhabitants of Ústí region. 52 % of respondents claimed themselves to be non-believers.

As discussed above, the situation in Brno region is different. Only about 20 % of respondents stated they are the non-believers. The most frequent stand-alone answer was the one of supreme power not called “God” (26 %). Strong affiliation with Christianity proves among possible dealing with Christianity – 21 % of respondents state to be Christians, but not attend masses or other spiritual meetings, 18 % claim to be an active part of the community and 8 % count themselves as Christians too, but they only attend masses (that means they do not usually attend other events connected primarily with Christianity).

Table 3: Religious/spiritual preferences of Geography students in Ústí and Brno (in %).

	Ústí	Brno
Non-believers	51,6	20,0
I do believe in some supreme power, but I would not call that power “God”	36,6	26,0
I am Christian, but I do not attend masses or other spiritual meetings	8,6	21,0
I am Christian, but I attend only masses	N/A	8,0
I am Christian and I am an active member of the community	3,2	18,0

Source: own research and processing

Conclusions

This pilot study focused on three particular issues related to the perception of the sacral and spiritual landscape meaning in the core areas of South Moravian and Ústecký Region. The purpose was to approximate religious and quasi-religious imagery of the surrounding spaces. Religiosity is a conditioned complex of individual and subjective opinions (but still it is possible to identify specific inner regularities) and its inquiry in the contemporary Czech Republic brings knowledge about the shifts in the spiritual attitudes of young population. These attitudes differ with regard to the specific conditions of selected territories, basically because of: 1) traditionally long-term higher religiosity in South Moravian Region which is reflected also in religious and spiritual attitudes of young population, in contrast with Ústí (and Ústecký) Region, where the population was mostly re-settled during the 20th century and traditional religious ties often were shattered; 2) specific relief which enables creating of personal spirituality mainly in Ústecký Region, and without a traditional religion. Regarding the landscape perception, natural spaces of hills and mountains became crucial in the selected group of respondents; it meant elevated places in the landscape which are often linked with the spiritual feelings when observing the landscape. The places of personal importance are also related to the important localities of Czech historic past, with mythology (Říp Mountain) or the suffering of not only Czech nation (Jewish Memorial in Terezín), but also with the places of the origin of the individual, who belongs to certain (micro)region of regular practices. In Brno Region the importance of places is connected with the origin of the respondent in concrete territory within Brno Region, but at the same time there is also a higher share of students coming from very different regions of the Czech Republic. Generally, from the Brno phase of the research it is possible to observe importance assigned to the sacral monuments which serve as a spiritual place, but also as an urban landscape dominant. The clearest example is definitely the Petrov Cathedral, followed by other sacral monuments (churches and monasteries); also the Slavkov (Austerlitz)

battlefield has an important role, with certain analogy with the Terezín (former Jewish concentration camp and today a memorial place) at Ústí Region; in both cases these are places commemorating human suffering. Nevertheless, regarding the daily or regular activities, it is not the place of study which is important for commuting students from the personal/spiritual point of view, but the place of home. It is more visible in the example of Ústí Region, but this phenomenon is observable also in Brno Region. Places and sites like these are also good to watch for their scenic road potential and consider their interconnection. In case of this article, it is possible to speak about creating sacral scenic roads.

Albeit declared religiosity (in the sense of claiming to be a member of concrete Church or at least frequent visitor of masses and other spiritual meetings) of students in Ústí nad Labem is extremely low, several places have been assigned a spiritual value: this can once more challenge the questioned thesis about the non-religiosity of (young) population of the Czech Republic and particularly in the Ústí Region. If we put to the account relatively strong religiosity of the part of the students in Brno and frequent formulation of several forms of spirituality (in both regions), we can conclude that young people (based on the example of the geography students) are relatively considerably spiritually concerned in both regions, developing their own spirituality; simply said, they are not atheist, as is often claimed regarding the population of the Czech Republic. There are new emerging research options of more focused, mainly qualitative inquiry, which has already been dealt with by one of the authors hitherto on the example of Moravian cities. There are new options of grasping the particular questions about which we now have general results, and a continuation in the relatively attractive study of religious and spiritual attitudes of (not only) young inhabitants of Brno Region and mostly Ústí Region, it means the territory with very marked and distinctive morphology, which strongly helps to the specific perception. The essence of our research is also the involvement of the collected data and knowledge in the teaching and further development of the concepts discussed above in the relation to the university teaching.

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References

- Bobr, L. & Novotný, G. (2018). Percepce sakrální a duchovní krajiny na Ústecku. In: V. Klímová, & V. Žitek (Eds.): *21th International Colloquium on Regional Sciences. Conference Proceedings* (pp. 586-594). Brno: Masarykova univerzita.
- Bobr, L. & Riezner, J. (2017). Scénické silnice a jejich proměny na příkladu USA a Německa. In *Geografické rozhledy*, 26(3), pp. 31–32.
- Cosgrove, D. (1993). *Social formation and the symbolic landscape*. Madison, Wisconsin: University of Wisconsin Press.
- Cloke, P. et al. (2004). *Practising Human Geography*. London: SAGE.
- Cloke, P. et al. (2014). *Introducing human geographies*. 3rd ed. London: Routledge.
- Český statistický úřad, (2014). *Náboženská víra obyvatel podle výsledků Sčítání lidu* [On-line]. Available: <https://www.czso.cz/csu/nabozenska-vira-obyvatel-podle-vysledku-scitani-lidu-2011-61wegp46fl>.
- DeCerteau, M. (1984). *The practices of everyday life*. Berkeley: University of California Press.
- Disman, M. (2008). *Jak se vyrábí sociologická znalost*. Praha: Karolinum.
- Forman, R., & Godron, M. (1993). *Krajinná ekologie*. Praha: Academia.
- Gondek, K. P. (2014). *Pressures of Hybridity: An Analysis of the Urban-Rural Nexus*. Calgary: University of Calgary.
- Hardy, A. (2006). *Drive Tourism: A Methodological Discussion with a View to Further Understanding the Drive Tourism Market in British Columbia, Canada* [On-line]. Prince George: UNBC. Available: https://www.unbc.ca/sites/default/files/assets/community_development_institute/publications/a_hardy_cdi_paper.pdf.
- Hartig, K., & Dunn, K. (1998). Roadside Memorials: Interpreting New Deathscapes in Newcastle, New South Wales. In *Australian Geographical Studies*, 36(1), pp. 5-20. ISSN 1467-8470. DOI 10.1111/1467-8470.00036.
- Havlíček, T. (2011). Sakrální objekty v krajině jako nedílná součást českého venkova [On-line]. Available: <http://www.dvs.cz/clanek.asp?id=6485631>
- Havlíček, T., & Hupková, M., (2008). Religious landscape in Czechia: new structures and trends. In *Geografie*, 113 (3), pp. 302-319. ISSN 1212-0014.
- Hendl, J. (2005). *Kvalitativní výzkum. Základní metody a aplikace*. Praha: Portál.
- Hopkins, P. (2015). Scales of Young People's Lives. In J. Wyn, & H. Cahill (Eds.), *Handbook of Children and Youth Studies* (pp. 761-772). London: Springer.
- Hynek, A. (2011). Geografie, geograficita – prostorovosti. In Svobodová, H. (Ed.), *Geodny Liberec 2008. Sborník příspěvků* (pp. 71-77). Liberec, Brno: GAREP.

- Hynek, A. et al. (2016): Thinking Space Geographically. In Gómez Chova, L.: *ICERI2016 Proceedings 9th International Conference of Education, Research and Innovation November 14th-16th, 2016* — Seville, Spain (pp. 1338-1346). Valencia: IATED Academy, 2016.
- Lipský, Z. (1998). *Krajinná ekologie pro studenty geografických oborů*. Praha: Karolinum.
- Lužný, D., & Nešpor, Z. (2008). *Náboženství v menšině*. Praha: Malvern.
- Mauch, C., & Zeller, T. (2008). *The World beyond the Windshield: Roads and Landscapes in the United States and Europe*. Athens (Ohio): Ohio University Press.
- Nairn, T. (1997). *Faces of nationalism*. Londýn, New York: Verso.
- National Geographic Česko (2017). *Na vrchol Australského symbolu Uluru už se turisté nepodívají* [On-line]. Available: <https://www.national-geographic.cz/clanky/na-australsky-symbol-uluru-uz-se-turiste-nepodivaji-20171103.html>
- Nešpor, Z. (2010). *Příliš slábi ve víře. Česká ne/religiozita v evropském kontextu*. Praha: Kalich.
- Nešpor, Z., & Vojtíšek, Z. (2015). *Encyklopedie menších křesťanských církví v České republice*. Praha: Karolinum.
- Nešporová, O. (2013). *O smrti a pohřbívání*. Brno: CDK.
- Nešporová, O., & Stahl, I. (2014). Roadside memorials in the Czech Republic and Romania: Memory versus religion in two European post-communist countries. In *Mortality*, 19(1), pp. 22–40. ISSN 1357-6275.
- Novotný, G. (2017). *Prostorové představy a praktiky mladých věřících v Brně*. [Rigorózní práce]. Brno: Masarykova univerzita.
- Novotný, G., & Daněk, P. (2017). Sekularizace nebo re-sakralizace? Prostory víry mladých věřících v Brně. In V. Klímová, & V. Žitek (Eds.), *XIX. mezinárodní kolokvium o regionálních vědách. Sborník příspěvků* (pp. 945-951). Brno: Masarykova univerzita. DOI 10.5817/CZ.MUNI.P210-8587-2017-124.
- Park, C. (1994). *Sacred Worlds: An Introduction to Geography and Religion*. London, New York: Routledge.
- Przybylska, L. (2015). Memorial crosses in Poland: a commonplace and contested element of public roads. In *Geografie*, 120(4), pp. 507–526. ISSN 1212-0014.
- Punch, K. (2008). *Základy kvantitativního šetření*. Praha: Portál.
- Raglan, L. (1964): *The Temple and The House*. Washington, D. C.: W. W. Norton.
- Relph, E. (1976). *Place and placelessness*. Londýn: Pion Ltd.
- Sauer, C. (1963). The morphology of landscape. In J. Leighly (Ed.), *Land and life: a selection from the writings of Carl Ortwin Sauer*. Berkeley: University of California Press.
- Schama, S. (2007). *Krajina a paměť*. Praha: Argo.
- Sklenička, P. (2003). *Základy krajinného plánování*. Praha: Naděžda Skleničková.
- Stibral, K. (2005). *Proč je příroda krásná*. Praha: Dokořán.
- Stibral, K., & Faktorová, V. (2015). *Krajina – maska přírody? Studie k estetice krajiny a environmentu*. České Budějovice: Jihočeská univerzita v Českých Budějovicích.
- Strauss, A., & Corbin, J. (1999). *Základy kvalitativního výzkumu*. Brno: Sdružení Podané ruce.
- Šiler, V. (2017). Prostor pro spiritualitu: Sakrální prostory v objektech péče vypovídají o české společnosti. In *Dingir: časopis o současné náboženské scéně*, 20(4), pp. 142-144. ISSN 1212-1371.
- Škoda Plánovač cest (2018). *Plánovač cest* [On-line]. Available: <http://dealer.skoda-auto.cz/mini-apps/new-routeplanner>
- Štampach, I. O. (2017). Dramatické posuny na náboženské scéně: Náboženství se v české společnosti po roce 1989 rychle mění. In *Dingir: časopis o současné náboženské scéně*, 20(4), pp. 142-144. ISSN 1212-1371.
- Tuan, Y.-F. (1974). Space and Place: Humanistic perspective. In *Progress in Geography*, 6, pp. 233–246.
- Tuan, Y.-F. (1977). *Space and Place. The Perspective of Experience*. Minneapolis: University of Minnesota Press.
- U. S. Department of Transportation (2018). *America's Byways* [On-line]. Available: <http://www.fhwa.dot.gov/byways>
- Václavík, D. (2010). *Náboženství a moderní česká společnost*. Praha: Grada.
- Wylie, J. (2007). *Landscape*. London, New York: Routledge.
- Zonneveld, I. S. (1995). *Land Ecology*. Amsterdam: SPB Academic Publishing.

School Autonomy In France According To Talis 2013: The Importance Of Educational Leadership

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Abstract

In recent years, school autonomy in France has become a central issue for the improvement of students' outcomes. French principals, who have a significant responsibility for learning tasks, play an active role in decision-making. The purpose of this study is to explore the correlation between the type of school (publicly or privately-managed) and the significant responsibilities of French principals which participated in TALIS 2013. The sample consisted of 174 participants. Descriptive data were generated for all variables (percentages and means). Pearson's chi-square test was used to determine if there is an association between the type of school and principals' responsibilities for some tasks. All analyses were carried out using SPSS, version 22. Findings suggest a significant correlation between the type of school and principals' responsibilities for dismissing teachers and establishing teachers' salaries. This study adds to a growing body of research that school-based management has an influence on principals' responsibilities for deciding which courses are offered and choosing learning materials.

Keywords: *Leadership, principals, professional autonomy, school autonomy, school-based management.*

Introduction

In France, not all schools assume the same responsibilities legal or administrative. Hence the fact that people who administer schools receive different names. Principal is the name of Lower Secondary Education directors and Proviseur, in the Lycée, of Higher Secondary Education. French principals of Secondary Education can make decisions to authorize expenses, modernize the equipment and make some items of the budget more flexible (Oria, 2009). A qualitative study by Tulowitzki (2013) described how five Parisian principals had spent their work time. Most of them put a low emphasis on school improvement. They had to face many tasks and responsibilities with a demanding level of complexity. Their activities were related to administration and relationship.

In France, the transition from lower secondary education to upper secondary education is particular: families are involved in a process of dialogue with the school. In the first step, families make a request. In the second step, the staff meeting formulates a proposal. Barg (2013) found that school staff's decision-making depended on families' requests and, therefore, had reproduced the differences between social classes. Parental involvement had a great influence on school staff's decision-making. From a legal point of view, French principals can make decisions related to the organization of teaching in their school, but not with their methods and contents. This task is carried out through a division of responsibilities between the administration, the year head and its team and the pedagogical area (teachers) (Normand, 2015). French public schools are managed through a centralized system in which all teachers and principals are government employees. Elementary schools have principals who teach in and manage their schools, whereas principals work full time in middle and high schools (Supovitz, 2013).

The administrative accountability has influenced schools in the long term, although it has not had important consequences on teaching responsibilities. There is a limited autonomy for schools, a framework for school choice of limited dimensions and an unsatisfactory decentralization (Derouet, Normand & Pacheco, 2015).

School principals have the right to be both leaders and spokespersons for their schools. An effective management of human resources requires the recognition of directors as leaders, which does not agree with the pedagogical autonomy and professionalism demanded by teachers (Dutercq, 2015).

In 2005, an accountability policy was implemented in the French educational system, but it remains bureaucratic, centralized and descending, without taking school improvement into account. French principals have limited autonomy because their tasks are limited by the national standards in the curricula, teaching and schedules in schools (Normand, 2016).

French students' scores in PISA tests are close to the average of the OECD countries in all subjects. The government created two action plans. One plan is intended to provide personalized assistance to students with learning difficulties. Another plan aims to give schools more autonomy to manage its budget (Baird et al., 2016). After the publication of PISA results in France, the French government implemented national standards, an evaluation based on the PISA methodology for eighth grade students (Hugonnier, 2017).

The growing inequality of student performance in the last 15 years, confirmed by PISA results and the fact that this inequality is the highest in Europe, has been the reason why school autonomy remains limited. Many teachers and parents believe in traditional teaching and question political measures that advocate the learning diversity (Michel, 2017). In a study investigating principals' workload in France, Leithwood & Azah (2014) reported that school improvement is related to highly motivated principals who perfect their leadership over time, take advantage of their abilities in different contexts and work with other principals.

Objective

This paper investigates the factors that influence French principals’ decision-making. The purpose of this study was to explore the relationship between the type of school (publicly or privately-managed) and the significant responsibilities of French principals for some tasks to improve school management.

The Study

Teaching and Learning International Survey (TALIS) is an international survey that offers the opportunity for principals to provide information about their professional development, practices, beliefs and school leadership. The questionnaire, which asks for information about policy matters and education, was completed by French principals (OECD, 2013).

Data were collected from TALIS 2013 results in France.

A variable is a construct or concept which is assigned to numerical values (DePoy & Gitlin, 2011).

A qualitative or nominal variable, which involves non-numerical observations, describes an individual by putting it into a group or category such as man or woman (Brase & Brase, 2016).

The values of a categorical or nominal variable are expressed as some categories, stated in words. If a categorical variable has two values is called a dichotomous variable. If it has more than two values, it’s called a polytomous variable (Quader, 2016).

Pearson's chi-square test was used to determine if there is an association between the type of school and the significant responsibilities of French principals. The chi-square test of independence is conducted to determine whether the frequencies’ distribution for one categorical variable is independent of another variable (Tokunaga, 2015). It’s used to test the null hypothesis that the outcomes’ proportions are the same all compared groups. The alternative hypothesis states that the proportions of outcomes are different (Hanneman, Kposowa & Riddle, 2013). The null hypothesis claims that there is no difference between compared groups or no relationship between variables. In contrast, the alternative hypothesis claims that there is a difference between compared groups or relationship between variables (Allen, 2017). If the P-value is less than 0.05, the null hypothesis is rejected and the alternative hypothesis is true. Then the result is statistically significant. If the P-value is equal to or greater than 0.05, the null hypothesis is accepted and the result is not statistically significant (Defusco et. al, 2015; Epstein & Martin, 2014).

In general terms, the alpha level or the level of significance is a probability level set before beginning hypothesis testing and determines the standard to reject the null hypothesis (Smith, Gratz & Bousquet, 2009). The alpha level sets the boundaries that separate high-probability samples (those that are likely to be obtained) from low-probability samples (those that are unlikely to be obtained) if the null hypothesis is true (Gravetter & Wallnau, 2009). In social sciences, it’s commonly used an alpha level = 0.05. The normal curve of the sampling distribution, which represents 95% of its area, is included within 1.96 standard deviation units. Any score farther away from the mean falls within the 5% region (2.5% on either extreme of the sampling distribution) (Meyers, Gamst & Guarino, 2006).

All analyses were carried out using SPSS, version 22.

Findings

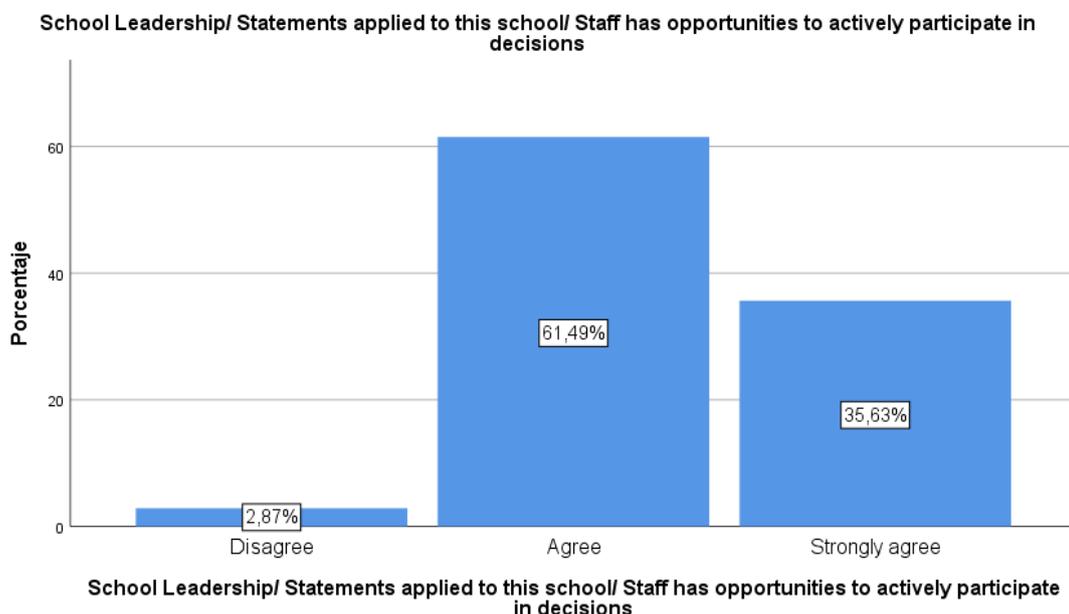


Chart 1. Percentage of French principals who answered the question “How strongly do you agree or disagree with this statement: This school provides staff with opportunities to actively participate in school decisions”.

Of two hundred and four French principals, one hundred and seventy four completed the questionnaire. 61.49% of French principals provide staff with opportunities to actively participate in school decisions, 35.63% of the respondent strongly agreed with the statement. A minority of participants (2.87%) disagree with the statement.

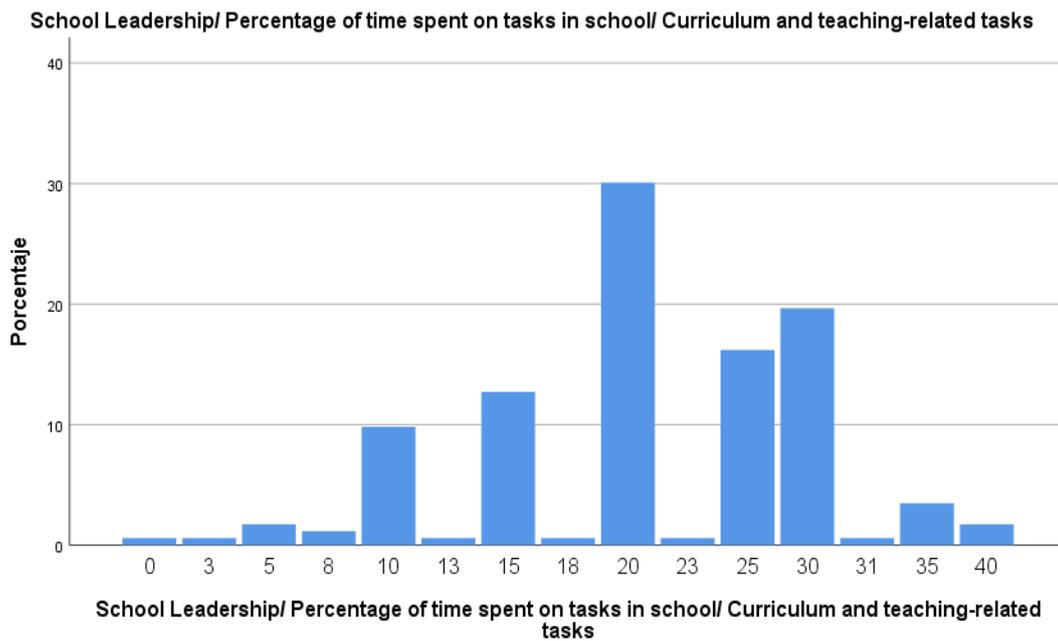


Chart 2. On average throughout the school year, percentage of time in the role as a principal that he/she spends on Curriculum and teaching-related tasks in school (Including developing curriculum, teaching, classroom observations, student evaluation, mentoring teachers, teacher professional development).

From the Chart 2 it can be seen that 30% of French principals have spent 20% of their time on Curriculum and teaching related tasks in school, 19.6% of them have spent 30% on their time, 16.9 of them have spent 25% of their time. 12.8% of French Principals have spent 15% of their time and 9.8% spent 10% of their time on Curriculum and teaching-related tasks. A minority of participants (less than 3%) have spent different percentages of their time on these tasks; for instance, 3%, 5%, 8%, 13%, 18%, 31%, 35% and 40%



Chart 3. Percentage of French principals who had a significant responsibility for deciding which courses were offered.

From the Chart 3 it can be seen that 37.8% of French principals had a significant responsibility for deciding which courses are offered, whereas 62.2% of them hadn't this responsibility.

Chi-Square distribution

The null hypothesis is accepted if the P-value is equal to or greater than 0.05 (the two variables are independent)

The alternative hypothesis is true if the P-value is less than 0.05 (the two variables are related)

	Value	df	P-value
Chi-square Distribution: Is there a correlation between the type of school (publicly or privately managed) and principals' responsibilities for dismissing teachers?	10,272 ^a	1	0.001

Table 1. P-Value of the correlation between the type of school and principals' responsibilities for dismissing teachers.

As Table 1 shows, there is a statistically significant correlation between the type of school (publicly or privately managed) and French principal's responsibility for dismissing teachers. The alternative hypothesis is true, so there is a difference between compared groups (public/private school principals) in relation to that task.

	Value	Df	P-value
Chi-square Distribution: Is there a correlation between the type of school (publicly or privately managed) and principals' responsibilities for deciding which courses are offered?	23,023 ^a	1	0.00

Table 2. P-Value of the correlation between the type of school and principals' responsibilities for deciding which courses are offered.

Table 2 shows a P-value = 0. There is a statistically significant correlation between the type of school (publicly or privately managed) and French principals' responsibilities for deciding which courses are offered. The alternative hypothesis is accepted, so there is a difference between compared groups (public/private school principals) in relation to that task.

	Value	Df	P-value
Chi-square Distribution: Is there a correlation between the type of school (publicly or privately managed) and principals' responsibilities for deciding on budget allocations within their school?	4,647 ^a	1	0.031

Table 3. P-Value of the correlation between the type of school and principals' responsibilities for deciding on budget allocations within their school.

Table 3 presents a P-Value = 0.031. There is a statistically significant correlation between the type of school (publicly or privately managed) and French principals' responsibilities for deciding on budget allocations within their school. The alternative hypothesis is true, so there is a difference between compared groups (public/private school principals) in relation to that task.

	Value	Df	P-value
Chi-square Distribution: Is there a correlation between the type of school (publicly or privately managed) and principals' responsibilities for choosing learning materials?	4,548 ^a	1	0.033

Table 4. P-Value of the correlation between the type of school and principals' responsibilities for choosing learning materials.

As Table 4 shows, the P-value is less than 0.05. There is a statistically significant correlation between the type of school (publicly or privately managed) and French principal's responsibility for choosing learning materials. The alternative hypothesis is true, so there is a difference between compared groups (public/private school principals) in relation to that task.

Conclusions

The findings of this study suggest that nearly 62% of French principals provide staff with opportunities to actively participate in decisions, but they can't decide which courses are offered in their schools. It has confirmed the findings of Iftene (2014) which found that French principals do not have any autonomy for raising private funds through donations, sponsorships and revenue from space rental.

The results indicate that 30% of French principals spend 20% of their time on curriculum and teaching-related

tasks, whereas nearly 20% of them spend 30% of their time.

Overall, this study strengthens the idea that principals' responsibilities for dismissing teachers or establishing teachers' salaries is related to the type of school (public or private). It has complemented the findings of an earlier study conducted by Maroy, Pons & Dupuy (2017), which reported that in France there was a "globalization by discursive internalization", in which transnational imperatives are integrated in official discourses on the regulation of the education system.

The results suggest that the type of school (publicly or privately-managed) plays a vital role in principals' responsibilities for deciding which courses are offered and choosing learning materials. It has provided a deeper insight into the school autonomy. Pons, Zanten & Da Costa (2015) reported that the introduction of New Public Management approaches and instruments in the field of education had not exerted a significant influence either on the public management of State-controlled private schools or on the coupling between the public and the private sector. The management of Catholic schools is still mainly based, on the one hand, on regulation through inputs and limited intervention by public authorities and, on the other hand, on a complex system of internal moral controls by the private authorities themselves.

References

- Allen, M. (2017). *The SAGE Encyclopedia of Communication Research Methods*. Thousand Oaks, CA: Sage Publications.
- Baird, J., Johnson, S., Hopfenbeck, T., Isaacs, T., Sprague, T., Stobart, G., & Yu, G. (2016). On the supranational spell of PISA in policy. *Educational Research*, 58(2), (pp.121-138). doi:10.1080/00131881.2016.1165410.
- Barg, K. (2013). The Influence of Students' Social Background and Parental Involvement on Teachers' School Track Choices: Reasons and Consequences. *European Sociological Review*, 29(3), (pp.565-579). doi: 10.1093/esr/jcr104.
- Brase, C.H. & Brase, C.P. (2016). *Understanding Basic Statistics*. Boston, MA: Cengage Learning.
- Defusco, R. (2015). *Quantitative Investment Analysis, 3rd Edition*. Hoboken, NJ: Wiley.
- Derouet, J.L.; Normand, R. & Pacheco, R. (2015). La modernización del sistema educativo en Francia: la Nueva Gestión Pública entre la afirmación del Estado y la gobernanza descentralizada. *Educação & Sociedade*, 36(132), (pp. 723-741).
- Dutercq, Y. (2015). Contemporary Models of Legitimacy of French School Principals. *Recherche & Formation*, 78, (pp. 35-50).
- Epstein, L., & Martin, A. (2014). *An Introduction to Empirical Legal Research*. NY: Oxford University Press.
- Gravetter, F.J. & Wallnau, L.B. (2009). *Statistics for the Behavioral Sciences*. Belmont, MA: Cengage Learning.
- Hanneman, R., Kposowa, A., & Riddle, M. (2013). *Basic Statistics for Social Research*. San Francisco, CA: Wiley.
- Hugonnier, B. (2017). France and PISA: An Unfinished Dialogue. En A. Wiseman, & C. Stevens, *The Impact of the OECD on Education Worldwide (International Perspectives on Education and Society*, 31 (pp.3-15). Bingley, UK: Emerald Publishing.
- Iftene, C. (2014). Educational Systems' Autonomy. Facts and Analysis. *Procedia - Social and Behavioral Sciences*, 42, (pp.47-53). doi:10.1016/j.sbspro.2014.07.586.
- Leithwood, K., & Azah, V. (2014). *Elementary Principals' and Vice-Principals' Workload Study. Final Report*. Ontario, CDN: Ontario Ministry of Education.
- Maroy, C., Pons, X., & Dupuy, C. (2017). Vernacular globalisations: neo-statist accountability policies in France and Quebec education. *Journal of Education Policy*, 32(1), (pp.100-122). doi: 10.1080/02680939.2016.1239841 .
- Meyers, L.S.; Gamst, G. & Guarino, A.J. (2006). *Applied Multivariate Research: Design and Interpretation*. Thousand Oaks, CA: Sage Publications.
- Michel, A. (2017). The contribution of PISA to the convergence of education policies in Europe. *European Journal of Education*, 52(2), (pp.206-216). doi: 10.1111/ejed.12218.
- Normand, R. (2015). French Principals in Secondary Education: Towards New Roles and Responsibilities? *Journal of Educational, Cultural and Psychological Studies*, 11, (pp.135-152). doi: 10.7358/ecps-2015-011-norm.
- Normand, R. (2016). France: Between Civil Service and Republican Ethics – The Statist Vision of Leadership Among French Principals. In H. Årlestig, C. Day, & O. Johansson (Eds.), *A Decade of Research on School Principals. Cases from 24 countries* (pp.357-374.). NY: Springer.
- Oria, M.R. (2009). Is school autonomy possible? The role of headmasters and educational projects in French, Italian and Spanish education systems. *Educación XXI*, 12 (pp.151-180).

- Pons, X.; Zanten, A.V.; Da Costa, S. (2015). The national management of public and Catholic schools in France: moving from a loosely coupled towards an integrated system? *Comparative Education*, 51(1), (pp. 57-50). doi: 10.1080/03050068.2014.935580.
- Quader, A. (2016). *Applied Statistics for Social and Management Sciences*. Thousand Oaks, CA: Springer.
- Smith, L.F; Gratz, Z.S & Bousquet, S.G. (2009). *The art and practice of Statistics*. Belmont, MA: Cengage Learning.
- Supovitz, J.A. (2013). Leadership lessons for French educators. *Phi Delta Kappan*, 95(1), (pp. 74-76).
- Tokunaga, H. (2015). *Fundamental Statistics for the Social and Behavioral Sciences*. Thousand Oaks, CA: Sage Publications.
- Tulowitzki, P. (2013). Leadership and school improvement in France. *Journal of Educational Administration*, 51(6), (pp.812-835). doi: 10.1108/JEA-03-2012-0026.

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Self – Efficacy Of Educational Employees: Social Activation Workers- Questionnaire Items Construction

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Abstract

This study deals with a specific aspect of an interview with a focus group. The aim was to concentrate on the educational aspect of perceived professional competence of social activation workers working with an endangered family. The focus group was implemented in order to generate professional survey items for use in a survey on "Self-efficacy". There were found 44 important formulations among 10 participants, which, by their content, are telling of the professional competence of employees, with a focus on the educational area of work in caring for children in families. Dispersed replicas will be used when creating a research tool as a part of one of three dimensions for measuring the professional competence of social activation workers working with endangered families.

Keywords: *Self-efficacy, social activation workers, education, focus group*

1 Introduction

The concept of "self-efficacy" has a relatively complicated background, and understanding it requires a certain knowledge of basic terms and interconnected mechanisms. Fusing together here are the terms self-esteem, self-confidence, self-identity with their question of the place in the internal structure of a personality. This theoretical background is a part of the broader "Bandura's" context of social cognitive learning. The field of social pedagogy has yet to deal much at all with the concept. The reason for our interest in the concept is its gap in the field. The scope and extent of social pedagogy in practice is undoubtedly broad, so the center of attention will be a specific professional group of field employees whose subject of interest is social prevention of endangered families and their educational questions of parenthood.

Child upbringing is one of the areas in which endangered families often need a certain measure of support. Members of every specific society are sensitive to deviations in educational practices, which from their point of view disturb the fulfillment of basic educational principles. It is a very sensitive topic and clearly no unity of opinion prevails in the right way to educate (Bechyňova, Konvičková, 2011).

In the current Czech school system, there are no job positions as a school social workers, a profession that has long traditions in a series of countries (Matoušek, Pazlarová, 2014). On the other hand, this system functions outside the school organization. Here, the employee enters as a intermediary between the child, the family and the school, or possibly local authorities. In recent years in the CR, there has been relatively broad development of so-called *social activation services for families with children*, which practically fulfill this role. In light of this fact, this profession is the constant central point of interest of our study.

The main objective of the submitted paper will be to generate professional items for the survey "Self- Efficacy" of social activation employees working with endangered families. This aim will be met through fulfilling the following two goals. The first will be to identify the educational nature of the job from the viewpoint of its employees, and then to determine directions of their work. The second goal will be to generate the formulation of the competence of an educational nature in the interaction "social employee – family".

1.1 Concept of self-efficacy

The concept of self-efficacy formed a fulcrum in the framework of the social cognitive theory of professor Albert Bandura, who researched social learning from elementary forms like imitation and social strengthening, through observational learning, up to the most complex form of teaching a person to act in accordance with accepted principles. Bandura thus approached cognitive and humanistic psychology (Nakonečný, 2008).

Bandura (1987, p. 391, 1997 p. 3) defines self-efficacy as "*the conviction of an individual about his abilities to organize and perform a certain activity, which is necessary for achieving specific goals.*" This means that the ability of perception influences her or his thinking, feeling and behavior. As stated by Bandura (1997, p. 394) "*it influences thought patterns, individually performed activities as well as emotional reactions during current or expected interactions with the environment*". It includes our certain judgment on our capabilities to organize or elaborate a gradual plan for achieving a desired performance. The level of self-efficacy is mainly given by:

- personal performance, which is influenced by previous successes or failures, (this aspect is considered the most influential),
- abilities to observe performed activities and learn during such observation,
- communication skills and the gift to argue,
- physiological and emotional factors, mainly by experiencing stressful reactions.

The consequences of the effects of these factors, especially gained experiences, contribute to forming impressions on one's validation both in the professional sphere and in personal life.

In light of this, the concept of self-efficacy deserves great attention mainly in the area of education and pedeutology. No less research attention is paid in other professional disciplines worldwide.

Researches efforts mainly ascertained the level of perceived professional competence of teachers in practice (Gibson & Dembo, 1984; Tschannen–Moranová & Woolfolk Hoy, 2001; Gavora, 2009, 2011; Gavora & Majerčíková, 2012; Greger, 2011, Šuverová & Ďurkovičová, 2012, Wiegerová & Ficová, 2012, Smetáčková et al., 2017). In the area of social pedagogy, Hrbáčková & Šafránková (2015) focused on this issue in the area of influencing the behavior of children, school success rates and leisure time of children with educational care center and children's home employees¹. It is important to mention, however, that in all ways, it concerned a personal conviction and not an objective finding.

According to Bandura (1997, 2012), it appears more advantageous to perceive one's capabilities more optimistically than pessimistically, because this is just what supports the application of professional competencies, i.e. true knowledge, skills and abilities in practice. A high level of self-efficacy helps create more optimistic stances, it contributes to approaching daunting tasks like challenges, and correlates to one's quality of life. These people aspire to achieve higher goals, they are more dogged in their efforts and generally more resilient towards failures.

In the framework of the profession, the specifically perceived competence is monitored through research less frequently (e.g. Chung, 2002). This is why we chose to research the specific profession. While searching international databases, we never came across any mention of a research tool of our selected professional group of employees specifically focused on working with families with children in the home environment. In light of this situation, we decided to work together in creating our own tool.

From the methodological aspect, constructing this tool thus appears highly complicated and complex, so it requires gradual steps towards constructing what will ultimately be a valid and reliable research tool.

In this study, we attempt to construct items for the survey "Self-efficacy" in the professional area with regard for the educational aspect of working with families.

1.2 Social activation services for families with children

It the currently established Czech system of care for endangered children exists the employee works as an intermediary between the child, the family, the school and possibly local authorities and professional institutions. The employee works directly in the field, and thanks to close contact with children and parents, he or she has good prospects for intervention. According to Franklin, Gerlach, Chanmugam's (2008) statistics, 12- 22% of children over the course of school attendance experience personal or educational issues over which they would like to consult with a professional. Among children from socially disadvantaged families, this number increases up to 50% .

In recent decades, the Czech republic has seen rather intensive development of "*social activation services*" for families with children - employees working in the terrain and helping families in educational areas and more. These are outreach programs implemented mainly by non-profit organizations and certain municipalities. This form of home care provides support to families with children whose development is endangered in consequence of the impact of a long-term crisis situation, which the family cannot overcome without outside assistance (Matoušek, Pazlarová, 2014). One of the activities of this service involves these very "*pedagogical, educational and activation activities*". So in practice one may observe a clear interconnection of social work with the family and support for education and upbringing of the children living in the family. A hidden aim in this is a certain preventative effect in families, which is a subject of interest of work in social pedagogy. In light of the nature of the research, we focus only on educational activity².

One of the target groups of support for families was designated in the mid-20th century as "multiple problem families" (Matoušek, Pazlarová, 2014). Other applied equivalents are the terms "*families in extreme distress*" (Sharlin, Shamaï, 2000), "*families in perpetual crisis*" (Kagan, Schlosberg, 1989) or "*underorganized families*" (Apponte, 1976).

Support for families in this direction means access to a family wanting to improve its situation in the interest of the child and adults alike, and only after possible failure to find an alternative solution for the child. It is necessary to strengthen and show sources of support to families and children, for whom this source has not been available and which is not their own.

¹ A methodologically interesting student is diploma thesis by M. Málek (2017) from FHS UTB "*Self-efficacy studentů sociální pedagogiky v řízení volného času klientů*" [Self-efficacy of social pedagogy students in managing clients' free time]

² Legislatively, these working activities are anchored in the CR in the framework of providing social activation services in Act No. 108/2006 Coll., Sec65(2) as "*pedagogical, educational and activation activities*". (author's note)

2 Methodology

Qualitative research is frequently used as a certain step towards quantitative research (Macek, 2012). In light of this fact, we have opted for a qualitative research strategy using a focus group. The focus group serves us as a supplementary method and source of preliminary information for our survey (Morgan, 2001).

2.1 Research objective

The objective of the implemented partial research is to generate items for the survey on professional competence (self-efficacy) of social activation service (hereinafter "SAS") employees for working with endangered families. In regard to the nature of the pedagogical research objective, we concentrate on the formulation of items focusing on the educational area of working with families. The main research question was: *"What professional competencies appear most frequently among SAS employees in the framework of educational activities of work?"* In relation to this, the main aim was to generate professional items into the survey "Self-Efficacy" in the framework of the social pedagogy field.

2.2 Research method

In regard to the specificity of the profession, we decided on a qualitative research strategy applying the method of a focus group. The effort was to emphasize the specificity and orientation towards specific and detailed clarification of the experience of participants for the needs of future creation of the survey. Preceding the method were individual in-depth interviews, which helped us gain insight on the impression of the specificity of the profession and determination of the dimension of the questionnaire. These detailed experience thus helped us provide a basis for asking questions for obtaining information on the needed competency in the profession. In consideration of our needs, we decided to concentrate specifically on the focus group with regard to the educational nature in the area of home care for families and their children. The focus group, whose communication among participants we analyzed, was implemented on the basis of previous addressing of employees in SAS.

An advantage that appeared was the ability to form a concentrated set of information and codes in a relatively short period of time, which provides direct proof of similar experiences of participants in comparison with obtained conclusions derived from analyses of previously performed individual interviews. Another advantage was the targeted focus of interested and the quantity of data obtained on it.

2.3 Research sample

The subject of the survey involved social activation service employees for their work with endangered families with underage children in the natural home environment. When implementing the research, we were conscious of the specifics of the given professional group. The focus group was formed of ten field employees working in the Zlin Region, Czech Republic. Work with the focus group was implemented in April 2018. To select, we chose the form of an intentional qualified selection of employees from facilities providing these registered services. We made our selection based on below characteristics:

- 1) an employee working in social activation services for at least one year,
- 2) an employee willing to participate in research and consenting to acquisition of an audio recording.

The participants were guaranteed anonymity, so no specific names of persons or individual facilities do appear in the study. Participation in the focus group was voluntary; the volunteers were informed in advance of the intention of the survey, so it is possible to discuss the potential motivation for taking part in the survey.

3 Analysis And Interpretation Of The Data

In our case, the focus group served mainly as a preliminary research technique to generate professional survey items in the survey "Self-efficacy", so the analysis and interpretation of data were controlled by the needs of our research project.

The objective of the focus group was first to ascertain information on the educational objectives of this work, and then to generate competencies and formulate them into items serving for construction of the professional dimension of the questionnaire "Self-efficacy".

In light of the field interest of social pedagogy, the subject of the focus was professional competence with regard to the educational aspect of work of SAS employees in the natural home environment. According to Průcha et al. (2013), education means overall and lifelong development of an individual's personality achieved in both formal educational institutions and in the informal environment. This is also the case of our research sample, specifically in the natural environment in which the interaction takes place, during which roles are emphasized of both social perception and common activities. In the most general meaning, education is designated as any situation with human participants during which some type of learning takes place. In light of this, we will search in the profession for activities that closely relate to the term "education".

The main established objective of the focus group was to formulate survey items of professional competencies of an educational nature, which are important for the profession from the viewpoint of its employees from practice,

to generate such items and to divide them up according to the educational goal. Participants were asked "*What can I do in areas of educational activities when working with a family?*" The proposals were discussed in the focus group. Around 56 replicas of certain activities were mentioned. We intentionally eliminated certain replicas because they did not fit in with the nature of our focus. Most frequently stated activities are then dispersed into 44 items speaking of their professional activities with regard to the identified aims. Participants agreed that during formulation of the wording, it is good to work with the terms, "*motivation, management and action*". (I2: 10 :^{3*} "...we show them patterns of behavior..." I5: 119: "...we need to motivate them...." I4: 273: "...we lead them towards not neglecting basic needs." I9: 46: "...we need to act on them in a certain way in various directions.") During formulation of characteristic items, we were bound by the theoretical concept of A. Bandura (2006) so that items would be formulated explicitly and would require of employees assessment of their own capabilities of implementing specific activities in relation to the family and children with varying target intentions. We modified the formulation of items adequately and stylistically based on the needs of our survey. We started from statements of individuals and followed up with the group consensus. We modified the statements of individual participants and kept the statements with the most frequent mentioning, and then broke them down according to educational goal. For clarity's sake, we provide them in the table. (Tab. 1)

From the table below, professional activities are seen with focus on the educational area of working with families that employees encounter in practice and apply during implementation of goals set together with the parents.

Table 1: Generated formulations of professional competencies

Pedagogical, educational and activation areas	Statements "What can I do in the area of educational work with a family?"
Education towards increasing competencies of parents in bringing up and educating their children	<ol style="list-style-type: none"> 1) To lead parents toward teaching their children basic questions of social education / thanking, asking, greeting/. 2) To support and lead parents towards strengthening development of creativity among children. 3) To show parents and children a different way to behave and act in upbringing difficulties and scholastic learning. 4) Motivating and leading parents to prompt their children to prepare for school and to support their development /individually, through specialized institutions/. 5) To motivate parents towards activities with children so as to positively influence the level and scope of their capabilities and skills. 6) To show parents during work and educational activities with children how to use appropriate educational-didactic aids for child development. 7) To support and lead families towards their children's higher scholastic success. 8) To direct and lead them towards follow-through in educational questions.
Education towards more effective communication	<ol style="list-style-type: none"> 1) To point out minor successes of the family and praise its members for these. 2) To create a good relationship with the family. 3) To adequately support the family in mutual communication. 4) To show them how to understand their own needs. 5) To activate and lead parents and children alike to work on controlling their emotions in crisis situations. 6) To teach parents to react appropriately to their child's needs. 7) To strengthen parents to lead children towards contact with their contemporaries.
Education on spending leisure time	<ol style="list-style-type: none"> 1) To motivate parents towards engaging in common, one-time leisure activities. 2) To support and motivate parents when searching for activities that could support their spending of leisure time. 3) To motivate and adequately engage children in leisure time activities. 4) To motivate parents to select leisure time activities for their children. 5) To motivate parents to search for (material) means for supporting leisure time activities of their child/children. 6) To adequately convey a system of positive values through an educational role model during leisure time activities.

^{3*}The following numbers gave sign the number of informant and the line in the recording. (author's note)

<p>Education towards practical skills in caring for the household and towards family financial issues</p>	<ol style="list-style-type: none"> 1) To point out to and help families set up a safe environment for their child's development. 2) To appropriately influence eating habits to positively impact the physical development and health of children. 3) To strengthen basic personal hygiene habits through education. 4) To provide good information on consequences of inefficient establishment of a regimen. 5) To motivate the family to instill an appropriate daily regimen and its regularity in important activities. 6) To inform and have a preventative influence on parents in questions of the debt issue regarding the family interest. 7) To lead and motivate the family in developing its financial stability for the needs of the children. 8) To motivate and lead parents towards gradual resolution of the family's debt situation in the interest of the children. 9) To motivate towards regularities in paying essential expenses for the family. 10) To motivate and lead towards economically more advantageous alternatives in the interest of sustaining the needs of children.
<p>Education towards searching for another support network for the family</p>	<ol style="list-style-type: none"> 1) To allow the family to decide in selecting offered solutions. 2) Through leadership and motivation, to enable parents to determine priorities and aims according to their personal potential. 3) To strengthen the ability of parents to request assistance when solving problems that they do not know how to resolve themselves. 4) To adequately recognize support of the nearby surroundings.
<p>Education towards handling stress and burdens in the family</p>	<ol style="list-style-type: none"> 1) To help family be able without authority oversight to refuse inappropriate proposals. 2) Through emotional support, to compensate for the stress burden of families. 3) To appropriately intervene and point out discrepancies of the family in the true and the established aim. 4) To compensate for feelings of frustration and disharmony by means of activation by enacting concrete steps. 5) To point out and teach recognition of the seriousness of the situation and convey to the parents the possible consequences. 6) To be able to perform together with the parents practical exercises of specific situations. (telephoning, requesting work, authorities, school) 7) To motivate and lead towards more independent responsibility by introducing personal examples.

(Source: own)

We gradually included activities that participants indicated as important in this area into the presented formulations, which we assigned according to the content aim of their activity.

In the focus group, the following objectives were defined, which employees most frequently try to pursue in cooperation with the parents:

- 1) **Education towards increasing competencies of parents in bringing up and educating their children.** (19 r. 73) "*...to teach them to orient themselves in everyday matters, how to teach children basic things, for example how to say thank you, how to behave during class, how to develop abilities in educational questions.*"

To achieve this objective, it is necessary to proceed by means of interviews that must be conducted with awareness of support, and not to enter into any cooperation with adult members of the family. Oftentimes inadequately developed competencies may relate to their personal history in various areas of life. According to the Bowlby theory of attachment (2010), the experience of parents from their original family has an influence on the development of adequate parental behavior (care models experienced, quality of relationship with parents), current relationships with parents, support and a peaceful environment.

(14: 276) "*...lead them not to forget the basic needs for the family, lead them through this process of ascertaining needs.*"

It is necessary to offer parents a different direction of thought and view of the child, and to help them gradually change if needed their external manifestations, attitudes and behavior towards the child. To help them be more thorough in perceiving their own needs and those of their children. To call on the parents to formulate an opinion that is alternative, more advantageous, which shows that a wrong opinion runs contrary to some value, which is important for the family or the children.

2) Education towards more effective communication.

(I8:72) *"To teach them to distinguish an adequate and inadequate environment and how to communicate among one another, what to do in crisis situations and how to recognize their seriousness."*

Communication is a so-called upholder of the relationship as well as an indicator of a certain quality. Unclear message with conflicting meanings may influence the nature of the relationship. For ambiguous conversation, its deciphering is very difficult for adult individuals, and practically impossible for children, who need clarity and understandability in communication. In this case, the role of the employee lies in being a communications intermediary. In a well-developed relationship, we can speak of a certain family mediator. According to Trélaün (2005), this form of support acts as a bridge between persons who have built a wall up between each other. It helps them search for dialog and the possibilities of a resolution. It concerns so-called dialogue clarification, which sometimes may move the positional roles to more favorable positions. According to Mareš (2007), opinions are formed especially in childhood in strong dependence to personal relationships and emotions, whereas discovery and opinions act together along with motives and emotions on the behavior and development of the personality. Among the important agents forming relationships and styles of communication is the so-called normality of individuals, as well as the resilience of members of a family towards the destructive effects of other family members, so in light of these needs, the role of a perceptive and sensitively reacting employee is oftentimes important.

3) Education on spending leisure time. Appropriately spent leisure time may be an indicator of the developmental formation of the individual's personality. This objective represents a very important area of development and interest of the parents in supporting the child, in selecting leisure time activities appropriate for him or her in terms of age and reasonable towards the family's financial limitation and the search for other possible variants and sources of financing.

(I1: 219) *"To show them what leisure time activities are offered by the nursery school, primary school, as though that source of information comes freely, they need not do anything actively there, but once it concerns some other offer and it is necessary to adequately motivate, this does not work very well in most families, ...a major task or role is played by the financial availability of activities, so consider in this too the interest of parents to become engaged and search for a solution for financial support."*

4) Education towards practical skills in caring for the household and towards family financial issues.

(I1:79) *"Support in running the household, this is the first step for us in training parental competencies, support in maintaining and managing the family budget."*

Sufficient functioning of the family in this direction is founded upon the fact that at least one family member in a certain extent and quality provides the household with what it needs. The most serious type of breakdown of this functioning comes from situations where nobody buys anything, nobody cooks, nobody cleans or does the washing, etc., thus nobody provides basic care for the household. Operation of the household can be broken down into individual bounded spheres: care for children (including preparing them for school), shopping, meals, personal hygiene, management of finances, animals, time organization, social contacts, etc.). To judge how the household is run, a well founded relationship is necessary.

(I4: 18) *"I first have to have a good relationship built up with the client."*

It is further necessary to have available information on how the family was living before this time, what difficulties they have encountered in the past and how other family members took part in running the household, what resources the family had and has, who helps the family and whether or not any significant breakdown occurred in the family...some crisis situation. Also possible to include here are eating habits, their regularity and age adequacy that supports healthy growth.

(I10: 90 -93) *"For example, we lead mothers to a regular meals regimen, we explain them the combination of appropriate and inappropriate foods, their consumption and appropriate shopping. Practical creation of a daily menu in combination with their budget, though some are very young or don't know it from family experience, and the same applies to personal hygiene habits."*

In this case, the family budget plays a key role. Setting boundaries between essential and non-essential expenditures should be the result of a dialog between the SAS employee and the family as indicated by Matoušek & Pazlarová (2014).

(I7: 103) *"Teach them to think and take their own path, that first I will pay the rent when I receive my allowance or pay."* **(I8: 106)** *"We work with consequences so they would realize what consequences they will face if they don't take this step, when they don't pay the priority expenses."*

From practice we know that handling one's own finances is among the difficulties that families often face. Difficulties in managing this also result from lack of experience and possible absence of support in this area.

- 5) **Education in seeking out a support network for the family.** The objective is to exchange information, to assess the situation of the child and the family, to create and interconnect a support network and to seek out and determine the optimum solution and plan for a common procedure, which leads to fulfilling the needs of the child. (Bechyňova, Konvičková, 2011)

(16: 157) *"When I see that the parent is not up to it intellectually to help with the child's homework, that it is beyond the parent's abilities, then according to need, I offer them the option of tutoring, some leisure time center, some volunteers or possibly experts in a specific problem."*

In this case, SAS employees attempt to search for motivation for support also among other support resources, including support from the wider family, friends or through the work of volunteers.

The focus group participants agreed that if the employee is working with a family

"online...., the family is capable of seeing and perceiving, so they can be shown specific things illustratively".(110: 123)

- 6) **Education towards handling stress and burdens in the family.** Stress can be understood as *a specific case of a more generally conceived burden*. This concerns a *state in which the measure of burden exceeds the acceptable limit in terms of adaptation possibilities of the organism under the given conditions* (Paulik, 2017, p. 65). Families with low self-confidence have a natural tendency to see the world as black and white. In consequence of this, it is necessary to notice qualities, successes and efforts, to realize their power, sources and abilities, and through support, to help them build self-confidence and a more realistic assessment and noticing of themselves individually.

(19: 216) *"Appreciation for that which they know, what they have already done."*

According to Soukup (2014), also necessary for this besides appreciation and recognition are material reflections, framing or summarizing spoken and perceived content shared by the client. In crisis situations, external assistance is generally important, providing a feeling of safety and emotional support and sharing important information. Clear arrangement of that which is shared may assist in achieving calm and a certain feeling of certainty. It is often appropriate to verify the possibilities of using one's own experience from similar situations, or those of people from the surroundings.

(110: 302) *"To lead them towards independence and most importantly, to ascribe to them responsibility for everything that is happening to them."*

(14: 65) *"...I activate them, I motivate them to come up with a solution in some way, to do it themselves and not let them procrastinate in resolving issues, and to proceed as such in similar situations as well."*

It is therefore possible to view the work as a certain form of education by an illustrative example, management and motivation. We can state that the educational nature of the work is thus in line with the opinion of Průcha et al. (2013, p. 345) on the current view of upbringing. Průcha views upbringing as *"a certain form of action, a process of intentional and purposeful creation and influencing of conditions enabling the optimal development of a person in accordance with his individual dispositions, stimulating his efforts in becoming an internally integrated and socialized personality"*. In this regard, it is necessary in practice along with the client to transform more general objectives into smaller, specific aims, which then can lead in the future towards affecting greater and longer-lasting changes in the family's life. A question of fulfilling these goals however is the certain level of openness of the family towards cooperation and their own motivation and desire to change (13: 18.) *"...but if they don't want to, nothing can help or our influence is minimal."*

Just like the field of medicine, social pedagogy also resolves the conflict between that which it knows and the question of how large a number of families to which it may provide this. In our case, it concerns intensive work with the family of mainly a long-term nature.

4 Conclusion

The center of attention of our study was the concept of professional competence self-efficacy of a specific group of employees. The subjects of research were field employees working with endangered families. This is a professional group of outreach employees whose job description involves working with the family as a whole, whose aim is to help family members to mutually fulfill their needs and to act properly in regards to the interest of the children in the family even in the environment outside the family. Their task is to have a preventative and secondary effect in the family's social and educational upbringing issues. The objective of the presented study was to generate professional items in the survey "Self-efficacy" of employees working in the field of social pedagogy.

In regard to the specificity of the profession, a part of which are preventative and educational activities taking into account the needs of the target group, we started primarily from the question of why the endangered family approached cooperation in the first place. Employees must be sensitive during interviews with individual members of the family, to listen to their "hidden needs" and apply their knowledge in the framework of counseling. Based on such knowledge, the employee influences the family through preventative activities.

Herzog (2007) states that most programs of field work come from the KAB model (Knowledge, Attitude, Behavior). Knowledge is the basis of counseling. In the framework of such knowledge, it is necessary to pass on to the family basic, mainly easy-to-remember information orally, and supplement this with various information brochures, etc. Through attitudes, employees form a safe environment, which makes room for specific opinions of individual family members, to be more empathic, and offer parents and children alike structuring of an attitude or acquiring new attitudes. Behavior enables parents to consult a real situation from their lives; in this case the employee may help them search for their own new solutions to a situation. The objective is to practice more socially acceptable behavior or to eliminate potential risks in the behavior of individual members of the family. Success was achieved in fulfilling the objective and in contributing to sensible recognition of educational activities in the framework of the profession. The dispersed formulations will be used in creating the research tool "Self-efficacy" of a specific professional group for working with families. However, generated items will represent only one area of the survey, the professional dimension. For the next two dimensions, personality and burden, which were not the subject of the submitted study, we will try to search based on the acquired data for adequate standardized surveys towards our research purpose.

We realize the limits of our study. There was only one focus group, or the gained data cannot be compared group-wise, on the other hand individual interviews with employees preceded the group. Use of a combination of two differing qualitative methods thus represents only a partial step towards the overall research objective for quantitative research.

We believe that the study will help us construct a valid and reliable research tool for examining the professional competencies of social pedagogy employees working in the natural environment.

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References

- Aponte, H. J. (1976). *Underorganization in the Poor Family*. In P. Guerin (Ed.), *Family Therapy: Theory and Practice*. New York: Gardner Press.
- Bandura, A. (1987). *Social Foundations of Thought and Action: A Social Cognitive Theory*. Prentice Hall: Englewood Cliffs.
- Bandura, A. (1994). *Self-efficacy*. In V.S. Ramachandran (Eds.), *Encyclopedia of Behavior* New York: Academic Press. 4, 71-81. Available from: <https://www.uky.edu/~eushe2/Banvychvedura/BanEncy.html>
- Bandura, A. (1997). *Self-efficacy. The Exercise of Control*. New York: W. H. Freeman and Company.
- Bandura, A. (2006). Guide for Constructing Self-efficacy Scales. In T. Urban & F. Pajares (Eds.). *Self-efficacy Beliefs of Adolescents*, Greenwich, CT: Information Age Publishing, 307–337. Available from: <https://www.uky.edu/~eushe2/Bandura/BanduraGuide2006.pdf>
- Bandura, A. (2012). On the Functional Properties of Perceived Self-efficacy Revisited. *Journal of Management*, 28 (1), 9-44. DOI: 10.1177/0149206311410606.
- Bechyňová, V., & Konvičková, M. (2011). *Sanace rodiny*. Prague: Portal.
- Bowlby, J. (2010). *Vazba. (Attachment)* Prague: Portal.
- Franklin, C., Gerlach, B. & Chanmugam, A. (2008). *School Social Work*. In Dulmus, C.N., Sowers, K.M.: *Comprehensive Handbook of Social Work and Social Welfare*. New York: John Wiley & Sons.
- Gavora, P. & Majerčíková, J. (2012). Vnímaná zdatnosť (self-efficacy) učiteľa: oblasť vyučovania a oblasť spolupráce s rodičmi. In *Pedagogická orientace*, 22 (2) , 205 – 221. DOI: 10.5817/PedOr2012-2-205.
- Gavora, P. (2009). Profesijsná zdatnosť vnímaná učiteľom. Adaptácia výskumného nástroja. *Pedagogická revue*, 61, (1 – 2), 19 – 37.
- Gavora, P. (2011). Zisťovanie profesijnej zdatnosti učiteľa pomocou dotazníka OSTES. *Pedagogika.sk*, 2, (2), 88–107. Available from: <http://www.casopispedagogika.sk/rocnik-2/cislo-2/Gavora.pdf>.
- Gibson, S., & Dembo, M. H. (1984). Teacher Efficacy: A Construct Validation. *Journal of Educational Psychology*, 76, (4) 569 - 589. DOI: 10.1037/0022-0663.76.4.569.
- Greger, D. (2011). *Jak čeští učitelé hodnotí vlastní efektivitu? Adaptace zahraničního dotazníku*. Paper at the conference ČAPV, Brno.
- Herzog, A. (2007). *Obsah terénní sociální práce s dětmi a mládeží*. In: Kontaktní práce. Prague: ČAS
- Hrbáčková, K., & Šafránková, A. P. (2015). Vnímání vlastní účinnosti pedagogických pracovníků v oblasti institucionální péče o děti a mládež. *Sociální pedagogika / Social Education*, 3, (2), 9-24. DOI: 10.7441/soced.2015.03.02.01

- Chung, Y. B. (2002). Career Decision - Making Self-efficacy and Career Commitment: Gender and Ethnic Differences Among College Students. *Journal of Career Development*, 28, (4), 277 – 289. DOI: 10.1177/089484530202800404.
- Kagan, R., & Schlosberg, S. (1989). *Families in Perpetual Crisis*. New York: Norton Professional Book.
- Macek, J. (2012). Nevyčíslitelné porozumění: Kvalitativní výzkum online sociálních sítí. *ProInflow: Časopis pro informační vědy*. Brno: MU FF. 4 (1), 151-137. Available from: <http://www.phil.muni.cz/journals/index.php/proinflow/article/view/814/943>
- Majerčíková, J. et al. (2012). *Profesijná zdatnosť (self-efficacy) študentov učiteľstva a učiteľov spolupracovať s rodičmi. (Teacher Self-efficacy in Instruction and in Parent Involvement)* Bratislava: UK.
- Málek, M. (2017). Self-efficacy studentů sociální pedagogiky v řízení volného času klientů (Diplomová práce). Zlín: Tomas Bata University Matoušek, O. & Pazlarová, H. (2014). *Podpora rodiny*. Prague: Portal.
- Matoušek, O. et al. (2010). *Sociální práce v praxi*. Prague: Portal.
- Morgan, D. L. (2001). Focus Group Interviews. In J. Gubrium & J. Holstein (Eds.), *The Handbook of Interview Research* (pp. 141–160). Thousand Oaks, CA: Sage.
- Průcha et al. (2013). *Pedagogický slovník*. Prague: Portal.
- Sharlin, S. A., & Shamaï, M. (2000). *Therapeutic Intervention with Poor, Unorganized Families: From Distress to Hope*. Binghamton, NY: Haworth Clinical Practice Press.
- Smetáčková, I., Topková, P., & Vozková, A. (2017). Vývoj a pilotáž škály učitelské self- efficacy. *Lifelong Learning - celoživotní vzdělávání*. 7, (2). 26- 46. DOI: 10.11118/lifele2017070226.
- Soukup, H. (2014). *Motivační rozhovory v praxi*. Prague: Portal.
- Šuverová, S. & Ďurkovičová, S. (2012). Vplyv vybraných faktorov na úroveň profesijnej zdatnosti vnímanej študentmi špeciálnej pedagogiky. In *Patopsychológia - vznik a vývin*. Bratislava: Comenius University.
- Trélaün, B. (2005). *Překonávání konfliktů v rodině*. Prague: Portal.
- Tchannen-Moran, M. & Hoy, A. W. (2001). Teacher Efficacy. Capturing an Elusive Construct. *Teaching and Teacher Education*. 17, (7). 783 – 805, DOI: 10.1016/S0742-051X(01)00036-1.
- Wiegerová, A. & Ficová, L. (2012). *Vnímaná profesijná zdatnosť začínajúcich a uvádzajúcich učiteľov*. In: Wiegerová, A. et al. *Self-efficacy (osobne vnímaná zdatnosť) v edukačných súvislostiach*. Bratislava: SPN.
- Zakouřilová, E. (2014). *Speciální techniky sociální terapie*. Prague: Portal.
- Act No. 108/2006 Coll., on social services, as amended*. (2018, June 10.). MPSV. Available from http://www.mpsv.cz/files/clanky/7372/108_2006_Sb.pdf

Self-Efficacy Of Educational Employees: Foreign Language Teachers

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Abstract

The main purpose of the study was an adaptation of a self-efficacy questionnaire for Czech EFL (English as a Foreign Language) teachers at secondary schools in the Czech Republic. It was an adaptation of the Teacher Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001) to Czech conditions. The data were collected in a survey completed by 200 respondents. The questionnaire was focused on the following dimensions "The English teachers' perceived efficacy for student engagement, classroom management, and instructional strategies". A validation of a research tool applied to these teachers and its following evaluation showed that the dimension for "classroom management" has not been confirmed by the factor analysis. Thus the final adapted research tool with 20 items in 2 dimensions has been designed.

Introduction

Self-efficacy is the belief in one's ability to influence events that effect one's life and control over the way these events are experienced (Bandura, 1994). This concept was developed within the social cognitive theory. There are four ways how to build self-efficacy: mastery experiences, social modeling, social persuasion and states of physiology. Teachers' beliefs about their own effectiveness, known as teacher efficacy, underlie many important instructional decisions which ultimately shape students' educational experiences (Sodak & Podell, 1997, p. 214). Understanding teachers' perceptions and beliefs is important because teachers, heavily involved in various teaching and learning processes, are practitioners of educational principles and theories (Jia, Eslami & Burlbaw, 2006). Teachers' beliefs in their instructional efficacy influence the kind of learning environment they create to orchestrate learning. Teachers with a high sense of of teaching efficacy believe that difficult students can be teachable if the teacher puts extra effort (Gibson & Dembo, 1984). According to Bandura (1997) teachers who believe strongly in their ability to promote learning create mastery experiences for their students, but those beset by self-doubts about their instructional efficacy construct classroom environments that are likely to undermine students' judgements of their abilities and their cognitive development (p.241). Gavora (2008) pointed that Gibson and Dembo supported at least two separate dimensions of teachers' perceived efficacy: Personal Teaching Efficacy (PTE), a teacher's belief that he or she can impact student learning and General Teaching Efficacy (GTE), a teacher's belief that profession in general brings about student change. Although a number of studies have investigated teacher efficacy in different school subjects, just a little research has been realized to explore the perceived efficacy in nonnative English speaking teachers at secondary schools in the Czech Republic. Thus in this study we explored self efficacy beliefs among Czech secondary school EFL teachers.

In the survey we investigated teachers' perceived efficacy for student engagement, classroom management, and instructional strategies. Data were collected through the adaptation of the Teacher Sense of Efficacy Scale (Tschannen-Moran & Woolfolk Hoy, 2001). The results showed that the dimension for management has not been confirmed by the factor analysis in the Czech conditions.

Method

Respondents

The respondents in the study were 200 volunteers = nonnative English speaking EFL (English as a foreign language) teachers working at secondary schools in the Czech Republic (82,5% grammar schools, 17,5% vocational schools). The questionnaires were distributed via emails, approx. 400. The return rate of the questionnaire was more than 50%.

The demographic data of the respondents are shown below (Table 2, 3 and 4). A total of 200 Czech EFL teachers (112 women, 88 men) between 1-31+ years of experience teaching English and the age group 26-61+ participated in this study. As can be seen from Table 3, the highest percentage of respondents was reached at the age group of 51-60, 46,5%. The highest percentage (41%) of length of practice years was achieved in the category 21-30.

Table 1: School Types

School types	Number	%
Grammar school	165	82,5
Vocational school	35	17.5
Total	200	100

Table 2: Respondents' Gender

Gender	Number	%
Woman	112	56
Man	88	44
Total	200	100

Table 3: Respondents' Age Groups

Age group	Number	%
	26 - 30	24
31 - 40	43	21,5
41 - 50	38	19
51 - 60	93	46,5
61 and more	2	1
Total	200	100

Table 4: Respondents' Length of Practice Groups

Length of practice group	Number	%
1 - 10	34	17
11 - 20	78	39
21 - 30	82	41
31 and more	6	3
Total	200	100

Instrument

A Czech adaptation of the Teacher Sense of Efficacy Scale = TSES (Tschannen-Moran & Woolfolk Hoy, 2001) in Teachers of English at secondary schools in the Czech Republic was developed for this study. Quantitative research dealt with the English teachers' perceived efficacy for student engagement, classroom management and instructional strategies. Firstly, the TSES questionnaire (12 statements) was translated into Czech language and then completed up to 45 statements, based on the Czech school background. Those 45 statements included three surveyed dimensions for student engagement, classroom management and instructional strategies. Each of the dimensions was made up with 15 statements (the piloting of understanding was checked on a group of 10 volunteers - Teachers of English at secondary schools). Secondly, the pre-checked questionnaires with 45 statements were distributed to secondary schools in the Czech Republic. All the answers regarding the teachers' self-efficacy were rated on 5-point Likert scales, ranging from never (1) to always (5). The study was carried out in spring 2018. Finally, the data obtained were analyzed using the SPSS programme.

Findings

To determine the suitability of the data, KMO and Bartlett's sphericity test was used.

Table 5: KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		,798
Bartlett's Test of Sphericity	Approx. Chi-Square	8961,511
	df	990
	Sig.	0,000

The data in the table show (the resulting coefficient 0.80) their suitability for factor analysis. We also examined the number of factors by using a scree test.

Table 6: A Scree Plot Test

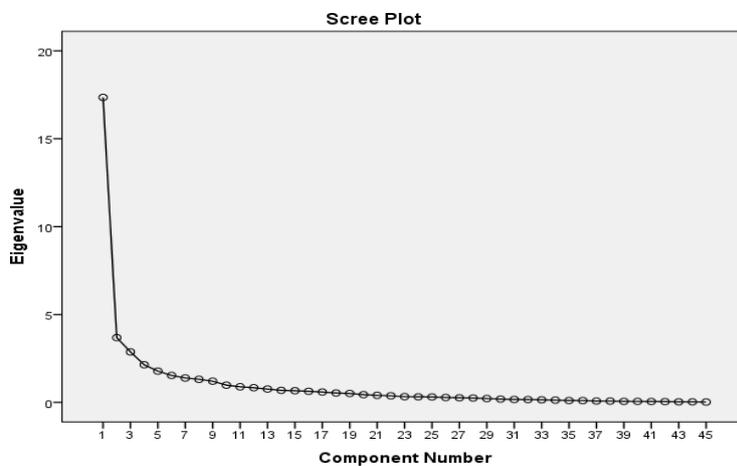


Table 6 clearly shows a break at the second factor. However, we tested a trifactorial solution, it did not appear to be interpretable. For the extraction of factors, the main component, Varimax Rotated Component Matrix method was used. As can be seen from the Table 7, there have been saturated 20 statements in 2 dimensions (the saturated dimensions are highlighted using the grey background).

Table 7: Rotated Component Matrix

	Component	
	1	2
S1	,432	,565
S2	,298	,589
S3	,144	,710
S4	,399	,469
S5	,027	,757
S6	,029	,672
S7	-,039	,731
S8	,149	,651
S9	,112	,473
S10	,198	,575
S11	,180	,669
S12	,333	,705
S13	,171	,722
S14	,273	,632
S15	,357	,729
S16	,458	,590
S17	,572	,560
S18	,387	,658
S19	,478	,493
S20	,464	,543
S21	,567	,328
S22	,494	,404
S23	,576	,266
S24	,539	,346
S25	,571	,448
S26	,504	,336
S27	,467	,437
S28	,444	,458
S29	,403	,600
S30	,491	,509
S31	,747	,389
S32	,726	,368
S33	,774	,268
S34	,808	,241
S35	,699	,267
S36	,369	,017
S37	,547	,130
S38	,787	,135
S39	,772	,164
S40	,732	,156
S41	,108	-,191
S42	,650	-,064
S43	,571	-,033
S44	,393	,022
S45	-,301	-,186

The table above shows the saturation of two factors in two dimensions, the first corresponds to teachers' perceived efficacy for „Student engagement”, and the second to “Instructional strategies”. The existence of the dimension

for teachers' perceived efficacy for "Classroom management" has not been confirmed. The number 0,40 and more has been set up for the sufficient level of saturation. The reliability of the instrument was assessed by computing Cronbach's alpha coefficients for each dimension, which resulted 0,89 in both components - teachers' perceived efficacy for „Student engagement”, and also for “Instructional strategies”.

Table 8: Total Variance Explained

Component	Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %
1	10,641	23,646	23,646
2	10,401	23,112	46,758

Extraction Method: Principal Component Analysis.

As it is shown in Table 8, the total variance for component 1 = „Student engagement” was 23,65%, respectively 23,11% for component 2 = “Instructional strategies”. The total variance explained resulted in 46,76%. According to Gavora (2012), in humanities, 50% score of total variance explained is considered to be a relatively good result, therefore we considered this level to be satisfying.

Results And Discussion

Table 9: Mean and Standard Derivation by Gender of Respondents,

Component 1 = „Student engagement” Component 2 = “Instructional strategies”

Mean and standard derivation by gender of respondents, Component I.	Component I	Component I	Component I	Component I
	Woman	Man	Woman	Man
	<i>M</i>	<i>M</i>	<i>SD</i>	<i>SD</i>
I am able to use professional teaching techniques to enable my students to acheive their best.	4,24	4,83	0,73	0,96
I am able to create a perfect teaching environment in my English classes.	4,28	4,17	0,60	0,61
When a student does not access the curriculum correctly I am able to use different teaching methods to motivate him / her.	4,37	4,28	0,55	0,64
I can adapt my teaching methods to differentiate between student individual educational needs.	4,34	4,23	0,50	0,53
I am able to give a personal example to increase the student motivation.	4,29	4,22	0,54	0,53
I am able to link the curriculum with practice in order to achieve higher interest in English.	4,36	4,24	0,50	0,55
I am able to praise a student in my English classes.	4,39	4,43	0,51	0,59
I am able to motivate a student to achieve their best in lessons.	4,31	4,10	0,60	0,65
I am able to achieve a sense of self-worth in a student.	4,24	4,06	0,59	0,66
I am able to properly introduce challenges in English classes.	4,32	4,22	0,57	0,65

I am able to employ/use the experiences and interests of the students in English classes.	4,13	4,07	0,53	0,54
Mean and standard derivation by gender of respondents, Component II.	Component II Woman <i>M</i>	Component II Man <i>M</i>	Component II Woman <i>SD</i>	Component II Man <i>SD</i>
I am able to be non-emotive feelings when interacting with a problem student.	4,37	3,90	0,60	0,53
I am able to prevent the occurrence of disturbing behaviour in my classes.	4,28	3,91	0,67	0,67
I respond adequately to cheating during tests within the classroom.	4,25	3,89	0,69	0,65
I am able to appreciate and respond to the positive student behaviour during classes.	4,56	4,43	0,53	0,58
I am able to deal with a situation when a student does not respond to/does not follow my instructions.	4,43	4,18	0,56	0,56
I am able to respond in a calm and professional way to inappropriate language in my classes.	4,44	4,05	0,62	0,67
I am able to give suitable consequences in cases of unacceptable behaviour.	4,52	4,23	0,43	0,67
I am able to remain calm and focused in the case of teaching in a challenging class.	4,21	3,84	0,73	0,84
I am able to clearly display to the students that the class teacher is in charge at all times.	4,63	4,42	0,50	0,63

Table 10: Mean and Standard Derivation by Respondents' Length of Practice

Component 1 = „Student engagement” Component 2 = “Instructional strategies”

Mean and standard derivation by respondents' length of practice, Component I.	Component I 1-10 years <i>M</i>	Component I 31 years and more <i>M</i>	Component I 1-10 years <i>SD</i>	Component I 31 years and more <i>SD</i>
I am able to use professional teaching techniques to enable my students to acheive their best.	4,02	4,17	0,50	0,40
I am able to create a perfect teaching environment in my English classes.	4,12	4,67	0,58	0,49
When a student does not access the curriculum correctly I am able to use different teaching methods to motivate him / her.	4,21	4,67	0,60	0,49
I can adapt my teaching methods to differentiate between student individual educational needs.	4,19	4,67	0,48	0,49
I am able to give a personal example to increase the student motivation.	4,27	4,67	0,52	0,49

I am able to link the curriculum with practice in order to achieve higher interest in English.	4,27	5,00	0,49	0,00
I am able to praise a student in my English classes.	4,38	4,17	0,52	0,40
I am able to motivate a student to achieve their best in lessons.	4,12	4,50	0,61	0,49
I am able to achieve a sense of self-worth in a student.	4,14	4,00	0,59	0,00
I am able to properly introduce challenges in English classes.	4,23	4,67	0,61	0,49
I am able to employ/use the experiences and interests of the students in English classes.	4,06	4,17	0,57	0,40
Mean and standard derivation by respondents' length of practice, Component II.	Component II 1-10 years <i>M</i>	Component II 31 years and more <i>M</i>	Component II 1-10 years <i>SD</i>	Component II 31 years and more <i>SD</i>
I am able to be non-emotive feelings when interacting with a problem student.	4,15	4,17	0,60	0,40
I am able to prevent the occurrence of disturbing behaviour in my classes.	4,04	4,67	0,65	0,49
I respond adequately to cheating during tests within the classroom.	4,02	4,17	0,57	0,40
I am able to appreciate and respond to the positive student behaviour during classes.	4,46	4,67	0,54	0,49
I am able to deal with a situation when a student does not respond to/does not follow my instructions.	4,23	4,67	0,58	0,49
I am able to respond in a calm and professional way to inappropriate language in my classes.	4,21	5,00	0,66	0,00
I am able to give suitable consequences in cases of unacceptable behaviour.	4,29	4,50	0,63	0,49
I am able to remain calm and focused in the case of teaching in a challenging class.	4,04	4,50	0,59	0,49
I am able to clearly display to the students that the class teacher is in charge at all times.	4,52	4,50	0,54	0,49

Table 11: Mean and Standard Derivation by Respondents' Type of School

Component 1 = „Student engagement” Component 2 = “Instructional strategies”

Mean and standard derivation by respondents' type of school, Component I.	Component I Grammar schools <i>M</i>	Component I Vocational schools <i>M</i>	Component I Grammar schools <i>SD</i>	Component I Vocational Schools <i>SD</i>
I am able to use professional teaching techniques to enable my students to acheive their best.	4,16	4,20	0,60	0,60
I am able to create a perfect teaching environment in my English classes.	4,24	4,28	0,58	0,50

When a student does not access the curriculum correctly I am able to use different teaching methods to motivate him / her	4,33	4,38	0,58	0,62
I can adapt my teaching methods to differentiate between student individual educational needs.	4,25	4,45	0,48	0,55
I am able to give a personal example to increase the student motivation.	4,26	4,25	0,52	0,59
I am able to link the curriculum with practice in order to achieve higher interest in English.	4,30	4,43	0,50	0,54
I am able to praise a student in my English classes.	4,39	4,43	0,52	0,54
I am able to motivate a student to achieve their best in lessons.	4,22	4,23	0,60	0,72
I am able to achieve a sense of self-worth in a student.	4,16	4,23	0,59	0,76
I am able to properly introduce challenges in English classes.	4,28	4,30	0,59	0,68
I am able to employ/use the experiences and interests of the students in English classes.	4,11	4,15	0,52	0,57
Mean and standard derivation by respondents' type of school, Component II.	Component II Grammar schools <i>M</i>	Component II Vocational schools <i>M</i>	Component II Grammar schools <i>SD</i>	Component II Vocational schools <i>SD</i>
I am able to be non-emotive feelings when interacting with a problem student.	4,24	4,13	0,63	0,58
I am able to prevent the occurrence of disturbing behaviour in my classes.	4,14	4,10	0,69	0,96
I respond adequately to cheating during tests within the classroom.	4,09	4,20	0,69	0,71
I am able to appreciate and respond to the positive student behaviour during classes.	4,50	4,55	0,56	0,55
I am able to deal with a situation when a student does not respond to/does not follow my instructions.	4,33	4,33	0,56	0,61
I am able to respond in a calm and professional way to inappropriate language in my classes.	4,29	4,23	0,66	0,72
I am able to give suitable consequences in cases of unacceptable behaviour.	4,43	4,30	0,62	0,64
I am able to remain calm and focused in the case of teaching in a challenging class.	4,09	4,95	0,76	0,92
I am able to clearly display to the students that the class teacher is in charge at all times.	4,56	4,50	0,57	0,59

Based on the SPSS programme analysis, the final adapted research tool with 20 items with 2 components has been designed. We suppose that the meaning of the statements for the dimension "Classroom management" seemed too similar to the dimension "Instructional strategies" to the respondents, therefore the findings were not saturated enough. The most significant findings obtained in the study, was the overall high ranking of answers. The lowest

number (3,84) on 5-point Likert scales, ranging from 1 never (1) to always (5), was *"I am able to remain calm and focused in the case of teaching in a challenging class"*. On the other hand, the highest (5,00) scored the statements: *"I am able to link the curriculum with practice in order to achieve higher interest in English"* and *"I am able to respond in a calm and professional way to inappropriate language in my classes"*.

For better statement orientation, as it can be seen above, tables 9 - 11 have been created: "Mean and standard derivation by gender of respondents table", "Mean and Standard Derivation by Respondents' Length of Practice table" and "Mean and Standard Derivation by Respondents' Type of School table".

The gender

The lowest score for women in "Student engagement" (4,13) was reached in the statement *"I am able to employ/use the experiences and interests of the students in English classes"*. In "Instructional strategies" with 4,21 it was *"I am able to remain calm and focused in the case of teaching in a challenging class"* statement. Considering the men, those were the statements with 4,06 *"I am able to achieve a sense of self-worth in a student"* in "Student engagement" and 3,84 *"I am able to remain calm and focused in the case of teaching in a challenging class"* in "Instructional strategies".

Full meanings of the highest score (4,39) reached for women were following: *"I am able to praise a student in my English classes"* in "Student engagement" and 4,63 *"I am able to clearly display to the students that the class teacher is in charge at all times"* in "Instructional strategies". The men scored highest with 4,83 *"I am able to use professional teaching techniques to enable my students to achieve their best"* in "Student engagement" and 4,43 *"I am able to appreciate and respond to the positive student behaviour during classes"* in "Instructional strategies".

The length of practice:

The lowest number in the group of participants with the length of practice 1-10 years (4,02) reached in "Student engagement" statement, was: *"I am able to use professional teaching techniques to enable my students to achieve their best"*. The same (4,02) number for "Instructional strategies" was scored: *"I respond adequately to cheating during tests within the classroom"*. On the other hand the group with the highest length of practice (31+) scored the highest (5,0) with the statement in "Student engagement" component with *"I am able to link the curriculum with practice in order to achieve higher interest in English"* statement. For "Instructional strategies" the same number (5,0) was reached: *"I am able to respond in a calm and professional way to inappropriate language in my classes"*. The implications of results obtained can assist in the importance of the length of practice for teachers in service.

A type of school:

The vocational school teachers surveyed, scored higher in all the statements for "Student engagement" than the grammar school teachers. This fact can be caused by the demands laid on the students in these types of schools. For the "Instructional strategies" the statement *"I am able to remain calm and focused in the case of teaching in a challenging class"* (4,95) scored the highest. The lowest resulted with 4,10 the statement *"I am able to prevent the occurrence of disturbing behaviour in my classes"*.

The overall results from the study indicates a very high level of self-efficacy in English language EFL teachers. Based on Bandura's (1997) theory, this finding is of value in that the teachers' judgements about their teaching competence influence EFL teachers' practice in efforts, goals, and challenges they set up for themselves and for their students.

The following step of the survey will be the correlation of the adapted questionnaire with the self-reported English proficiency of the abovementioned respondents and their self-reported pedagogical strategies.

References

- BANDURA, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71-81). New York: Academic Press. (Reprinted in H. Friedman [Ed.], *Encyclopedia of mental health*. San Diego: Academic Press, 1998).
- BANDURA, A. (1997). *Self-efficacy: The exercise of control*. New York: Freeman.
- BANDURA, A. (2001). Social cognitive theory: An agentic perspective. *Annual review of psychology*, 52, 1-26.
- ESLAMI-RASEKH, Z. (2005). Enhancing the pragmatic competence of NNEST candidates. *TESOL NNEST Newsletter*, 7(1), 4-7.
- GAVORA, P. (2008). *Úvod do pedagogického výskumu*. Univerzita Komenského v Bratislavě.
- GAVORA, P. (2012). *Tvorba výzkumného nástroja pre pedagogické bádanie*. Bratislava: Slovenské pedagogické nakladateľstvo.
- GIBSON, S. & DEMBO, M. (1984). Teacher efficacy: A construct validation. *Journal of Educational Psychology*, 76(4), 569-582.
- CHACON, C. T. (2005). Teachers' perceived efficacy among English as a foreign language teachers in middle schools in Venezuela. *Teaching and Teacher Education*, 21(3), 257-272.
- JIA, Y., ESLAMI, Z. R., & BURLBAW, L. (2006). ESL teachers' perceptions and factors influencing their use of classroom-based reading assessment. *Bilingual Research Journal*, 29(2), 459-482.
- SOODAK, L. C. & PODELL, D. M. (1997). Efficacy and experience: perceptions of efficacy among preservice and

practicing teachers. *Journal of Research and Development in Education*, 30, 214-221.

TSCHANNEN-MORAN, M. & WOOLFOLK HOY, A. (2001). Teacher efficacy: Capturing an elusive construct. *Teaching and Teacher Education*, 17, 783-805.

YILMAZ, C. (2011). Teachers' perceptions of self-efficacy, English proficiency, and instructional strategies. *Social behavior and personality*, 39(1), 91-100.

Smart Phone Usage Of Faculty Of Education Students In Learning-Teaching Environments

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Abstract

In this research, it was aimed to identify how student teachers use smartphones in learning-teaching environments, their intended purposes in using smart phones, and their perceptions on how to develop the use of smartphones in learning-teaching environments. The research was conducted with screening model and 570 student teachers who study at Faculty of Education in Duzce University and Aksaray University in 2017-2018 academic year were included in the scope. The data were collected with "The Use of Smart Phones in Learning-Teaching Environments Scope" which is developed by Göksoy and Yenipinar (2017). The data were analyzed and interpreted using T-test and Anova test. Research results demonstrate that student teachers know how and why they should use smart phones in learning-teaching environments. It is also found that student teachers' views on how and why they use smart phones are at a high level and that their views on the development of the usage of smart phones are at a moderate level. Student teachers' views on smartphone use, purpose and necessity in the learning-teaching environments, designing and developing smartphone usage do not differ according to university, gender and age variables. However, these are significantly different according to the field variable. The highest level of use in the learning-learning process is among students studying in the field of foreign languages. Second place is classroom teaching students and the lowest usage among the groups belongs to the students in social sciences teaching. Based on findings; it can be said that it is necessary to offer student teachers different activities and applications, additional education and personal development opportunities in order to improve the usage of smartphones in learning teaching environments.

Key Words: *Learning- teaching, teacher, smart phone*

Introduction

Today's contemporary society and its constituent individuals have advanced technology and use it intensively when compared with the examples of the past. People, especially children and young people, feel and experience technology more efficiently in their lives (Yıldırım, Yaşar and Duru, 2016). Smartphones, one of the most common products of contemporary information technology, have entered into every aspect of life. It is not possible to prevent this situation. Today, students live and grow up with technology (Ağca and Bağcı, 2013). It can be seen that some of the students who have recently started school have more functional information about technology than their teachers have. While the contemporary individual is constantly changing, transforming and developing the technology, at the same time their behaviors are being influenced by the technology they created.

To provide functional education services to large masses, to improve human and material resources, to provide high quality education, to meet individual differences and community demands, to raise social justice, democracy and equality in education, to reduce costs, to make use of the existing opportunities in the best and creative way are the indispensable necessities of technology and educational technology. These benefits of educational technology depend on the power of technology, the quality of the educational philosophy on which it is based, and the reliability of the educational science. The success of educational technology can improve only with the importance given to education. Also, educational technology reach significance if it focuses on actual needs of education in a planned and programmed way (Alkan, 1997; MEB, 2002).

While information technology in education is defined as tools to help teachers in order to educate and enhance the quality of education during educational activities (Aşkar, Seferoğlu, 2006), instructional technology can be defined as the application of systematic information which is obtained from scientific researches to practice (Yalın, 2003). Instructional technology is the application of systematic strategies and techniques adapted from behavioral sciences, physics and other sciences with aim of solving teaching problems. According to this definition: instructional technology is concerned with how the problems in teaching can be solved according to scientific principles. Instructional technology and materials are important in order to ensure that learning is more qualified. Teaching with technology and materials decreases the need to spend time and energy on determining the needs of students and adjusting the education accordingly. If the concepts of technology and material are handled

educationally, it can be indicated that they have many functions. The main functions are teaching-learning materials. They convey information, provide presentations and conversation. They are objected education systems and symbolization tools (Kaya, 2006).

When we look at the place and importance of tools in teaching, research results show that instructional technology and materials must be utilized in order to reach the goals in all kinds of educational applications. The more a learning activity is addressed to the sensory organs, the more permanent the learning is, the later it is to forget. We learn things % 83 through the sense of seeing, % 11 through the sense of hearing, % 3.5 through the sense of smelling, % 1.5 through the sense of touching and % 1 through the sense of tasting. Teaching is made more economical with the use of technology and materials (Yalın, 2003). At this point, smartphones enable teachers and students to access many opportunities quickly and with less effort and resources. Many objects, cases, personal information, photographs and situations can be reached instantly and used in learning-teaching environments.

Teachers' attitudes and skills related to the use of technology and materials are effective in students' learning levels. Some teachers may have enough knowledge to use technology and materials in their lessons, but some may not. Some teachers may be reluctant to use newer and current technology and materials. In addition, some teachers may feel pressure with the impression that it is difficult to use technology and materials, or they may rely more on traditional strategies and traditional technologies and materials. With all these assumptions, the use of smartphones in educational environments is an inevitable reality. Even if principals and teachers are not fond of it, these tools have fallen into teaching environments. Educators can not prevent these tools from being used in school and teaching environments by prohibition or other methods. Instead, it is a more logical and realistic approach to take advantage of these tools, which enter into teaching environments without the cost of public services. For this reason, teachers have to be good at using smartphones for educational purposes. In order to get reduce the negativities in this regard, teachers should be given necessary information and training on how to use educational technology products (Kaya, 2006). In educational applications, there are three main requirements to use instructional technologies and materials. The first is to bring education services to wider masses, the second is to make the learning-teaching processes in existing educational institutions more productive, and the third is to individualize learning and teaching activities. All other possibilities provided and can be provided by teaching technology and materials seem directly or indirectly related to these three basic needs mentioned above. To put it more precisely, it can be said that instructional technology and materials are mostly used in studies which are aimed at creating capacity in education and increasing the productivity of education (Hızal, 1983).

Instructional technology and materials had secondary importance in the learning-teaching environments, but in recent years the use of technology and materials has become more obvious, especially with the development of instructional technology and materials. The use of technology and materials in teaching is more difficult than the use of traditional teaching tools. It requires the use of more technical, complex and combined information. Therefore, it is harder to include technology and materials in the scope of methodological applications. Because advanced technology and materials may create more obstacles, are more complicated and more expensive. In addition, since they attract attention while using, they require guidance and training in their usage (Kaya, 2006). The above clarifications illustrate the need for greater use of technology for faster, more effective learning in an educational process that fully meets social needs. Teaching tools provides various ways and environments through which the information can reach the learner (Yalın, 2003). For this reason, technology should be used as a tool rather than a goal in educational settings. The main reason for the existence of technology is that people develop tools and methods to solve their own problems. These tools and methods can reach their goals only if they are used correctly (Kaya, 2006).

In this world of information, information is increasing at a rapid rate as a result of the effect of technology. The increasing problems of today's world such as overpopulation, information explosion, access to information, production of information, individualization can only be solved by utilizing contemporary technologies. It is not possible to solve today's problems with yesterday's method. Thus, we have to solve today's problems using today's opportunities. Today, business and operations are being carried out on information networks that are spread all over the world and open to everyone's use. According to Marşap (1999), advances in science and technology, particularly rapid changes in information technology, are pushing modern organizations to seek more successful managerial practices (cited from Balay, 2013). Smart phones are one of the solutions reached at the end of this seeking and the most widely used one. Smartphones are today's popular technology devices that combine many features, such as the Internet, a camera, video, audio recorder, navigation, music player, as well as communication applications. These features are rapidly increasing the areas and rates of the usage smartphones (Demirci, Orhan, Demirtaş, Akpınar and Sert, 2014). Smartphones that provides opportunity to use all of the features interactively have sneaked into all areas in life and this cannot be avoided even in the most private areas. Learning-teaching environments are also one of these areas. Teachers and faculty members can not prevent the use of smartphones

in classrooms, especially for young people because of their interest. In this case, the rational behavior should be to seek ways to utilize these tools in the direction of educational goals.

The aim of the research is to identify how student teachers use smartphones in learning-teaching environments, their intended purposes in using smart phones, and their perceptions on how to develop the use of smartphones in learning-teaching environments. The following questions have been sought in the research:

- 1) What are the opinions of student teachers on the usage, necessity and purpose of smartphones, and on improving the use of smartphones in teaching-learning environments?
- 2) Is there any significant difference among the opinions of student teachers on the usage, purpose, necessity and improvement of the use of smartphones in terms of university, gender, age and field/branch variables?

Method

In the research, the screening model was used in order to determine the current situation. In screening research, the appearance of a particular situation that occurs at a given time can be investigated as well as the changes that generally occur over time in a previously determined topic (Christensen, Johnson & Turner, 2015).

Data Collection Tool

A scale was used in the research in order to collect data. “The Use of Smart Phones in Learning-Teaching Environments Scope” which is developed by Göksoy and Yenipinar (2017) was applied. The scale consists of four parts. In the first part, there is personal information form. This form is designed to analyze students in more detail and to determine what effects student characteristics may have on variables. The other sub-sections are: a) How to use the smartphone (1, 2, 3, 4, 5 (n = 5), b) The purpose and necessity of the smartphone (6, 7, 8, 9, = 5) and c) Improvement of the smartphone use (11, 12, 13) (n = 3). The general alpha coefficient of the scale (.864), in order of size; how to use the smartphone (.811), the purpose and necessity of the smartphone (.765), and the improvement of smartphone use (.665). The alpha reliability of the scale was re-calculated with the current research and the results are as follows: scale general alpha coefficient (.764) according to dimensions; How to use the smartphone (.870), the purpose and necessity of the smartphone (.865), and the improvement of smartphone usage (.894).

Data Analysis Method

In line with the aim of the research, normality and skewness-kurtosis values were examined by applying the Kolmogorov-Smirnov and Shapiro-Wilk tests to the collected data before analyzing the subproblems. As it is seen in Table 1, it was determined that the subscales of the scale demonstrated normal distributions in terms of personal variables. After this process, data of 570 participants were analyzed. In the analyzes of the data, descriptive statistics (f, Ss), t test from parametric statistical techniques and One Way Anova Test were used for analysis and interpretation. For the interpretation and grading of the mean scores obtained according to the quintile scale used in the scale: 1.00 - 1.79 (never), 1.80 - 2.59 (rarely), 2.60 - 3.39 (occasionally), 3.40 - 4.19 (frequently) 4.20 - 5.00 (always) were used.

Table 1. Kolmogorov-Smirnov results of the scale

	Kolmogorov-Smirnov		
	Statistic	Df	Sig.
How to use the smartphone (HTUS)	,085	570	,000
The purpose and necessity of the smartphone (PANOS)	,077	570	,000
Improvement of the smartphone use (IOSU)	,108	570	,000
University	,367	570	,000
Gender	,464	570	,000
Age	,512	570	,000
Field/Branch	,211	327	,000

Research Population and Sample

The population of the research is composed of 939 undergraduate student teachers who are studying at Düzce University Faculty of Education and 996 undergraduate student teachers who are studying at Aksaray University Education Faculty in 2017-2018 academic year. The scales were distributed to all student teachers consisting the population, however they were applied only to 720 student teachers who stated that they would participate voluntarily. According to the results obtained from the scales given to 314 students from Düzce University Faculty of Education and 256 students from Aksaray University Faculty of Education, the scale was found to be suitable for research purposes. Thus, the results were interpreted on a total of 570 scales.

Demographic variables selected in the research are university, gender, field (branch) and age. Distribution of participant student teachers in terms of demographic variables is given in the following tables. The distribution of the student teachers in the research in terms of university variable is demonstrated in Table 2.

Table 2. Distribution of participants in terms of university variable

University	N	%
Düzce	314	55
Aksaray	256	45
Total	570	100

As seen in Table 2; 55% of the student teachers have been studying at Düzce University; 45% of them have been studying at Aksaray University. The distribution of participants according to universities appears to be very close to each other. The distribution of the student teachers in the research in terms of gender variable is demonstrated in Table 3.

Table 3. Distribution of participants in terms of gender variable

Gender	N	%
Female	423	74
Male	147	26
Total	570	100

As it is shown in Table 3, %74 of the student teachers who participated in the research are female and %26 of them are male. It can be concluded that this distribution reflects the real situation.

The distribution of the student teachers participated in the research in terms of age variable is demonstrated in Table 4.

Table 4. Distribution of participants in terms of age variable

Groups	N	%
17-25	483	84,7
26-35	87	15,3
Total	570	100

As it can be seen in Table 4, The majority (84.7%) of the student teachers who participated in the research were between the ages of 17-25.

The distribution of participant student teachers in terms of field/branch variable is given in Table 5.

Groups	N	%
Turkish-Literature	142	24,9
Psychological Counseling and Guidance	142	24,9
Classroom Teaching	100	17,5
Social Sciences	43	7,5
Foreign Language	43	7,5
Mathematics	100	17,5
Total	570	100

As it is demonstrated in Table 5, 24.9% of the student teachers participating in the research are in the field of Turkish and Literature; 24.9% in Psychological Counseling and Guidance; 17.5% in Classroom Teaching and 17.5% in Mathematics Teaching. Students with the least participation (7.5%) are in Social Studies and Foreign Language education in the research.

Findings

In this section, the findings obtained from the collected and analyzed data in the research process are given in the order of research subproblems. In addition, interpretations were given on the reasons for the findings.

1) The first subproblem of the research: “*The opinions of student teachers on the usage, necessity and purpose of smartphones, on improving the use of smartphones in teaching-learning environments*” is given in Table 6 according to scale subdimensions.

Table 6. Arithmetic mean and standard deviation values for smartphone use

Dimensions	N	\bar{X}	SS
How to use the smartphone (HTUS)	570	3,730	,772
The purpose and necessity of the smartphone (PANOS)	570	3,481	,808
Improvement of the smartphone use (IOSU)	570	2,570	,972
Final Total	570	3,260	,705

As can be seen in Table 6: opinions of the student teachers participating in the research on how to use the smartphone and on the necessity and purpose of using smartphones are at “frequently” level. It can be indicated that student teachers use smart phones in learning-teaching environments and they know how and why smartphones are used in learning-teaching environments. Opinions of the participant student teachers on improving the smartphone use are at “occasionally” level. The final total of the opinions about the smartphone use is at moderate level. As seen in the table, the standard deviations of research findings are close to one another. It can be said that the opinions of the participants have not been very different different.

Table 7 demonstrates the item-based mean and standard deviation values in order to elaborate the opinions of participant student teachers regarding smartphone use in learning-teaching environments.

Table 7. Arithmetic mean and standard deviation values of the scale items regarding the use of smartphones in teaching-learning environments

Dimension	No	Item	\bar{X}	Ss
How to use the smartphone (HTUS)	1	I know how I can use smart phones - in a suitable way according to the topic.	4,08	,87
	2	I can explain the difference among the educational programs in the smartphone.	3,44	1,03
	3	I can explain the importance of the use of smartphone in a lesson.	3,75	1,03
	4	I can analyze the role of smartphone according to time and experiment within the learning teaching process.	3,61	,97
	5	I can use the smartphone to evaluate the learning teaching process.	3,75	1,10
The purpose and necessity of the smartphone (PANOS)	6	I use the smartphone for educational purposes in educational environments (classrooms, lecture halls, etc.).	3,54	1,09
	7	The use of smartphones in teaching and learning environments affects the educational quality positively.	3,58	1,04
	8	There is an educational need for smart phones to be used in teaching-learning environments.	3,42	1,12
	9	I think that using smartphone in teaching-learning environments may be beneficial for education and training.	3,62	1,05
	10	Faculty members have the necessary information and technology to use smartphone in educational settings in accordance with their educational purposes.	3,23	1,10
Improvement of the smartphone use (IOSU)	11	I use smartphone to determine negativities in educational environments (classrooms, lecture halls, etc.).	2,73	1,07
	12	I can develop an original model for smartphone use that will solve the problems in learning-teaching process.	2,53	1,21
	13	I can design smartphone use for learner-based education.	2,43	1,24

As it is seen in Table 7, when the arithmetic mean values of student teachers’ levels of smartphone use in the teaching-learning environments are handled on the basis of item, the item stated as “I know how I can use smart phones in a suitable way according to the topic” has the highest mean value ($\bar{X}=4,08$). The following item is stated as “I can explain the importance of the use of smartphone in a lesson” ($\bar{X}=3,75$) and it is given as the third one. Item that has the lowest mean value is the thirteenth which is stated as I can design smartphone use for learner-based education ($\bar{X}=2,43$). The items lower than the thirteenth are the twelfth “I can develop an original model for smartphone use that will solve the problems in learning-teaching process” ($\bar{X}=2,53$) and the eleventh “I use smartphone to determine negativities in educational environments (classrooms, lecture halls, etc.)” with the mean of ($\bar{X}=2,73$). Average scores of two items with the highest average are at “frequently” level and average scores of three items with the lowest average are at “occasionally” level. The obtained findings demonstrates that opinions of the student teachers participating in the research on the use of smartphone and on the necessity and purpose of

using smartphones are at “frequently” level and their opinions on the improvement and design of the use of smartphones are at moderate level. It is concluded that smartphones are highly used in learning-teaching environments. Nevertheless, it is not completely certain that this usage is suitable for educational purposes. On this subject, research should be carried out, especially on the smartphone usage contributing to the aims of education. The fact that the lowest arithmetic mean values are on the improvement of smartphone use is a matter to be considered. The necessary arrangements should be made so that the tools of the educational technology can be developed and the student teachers are equipped with the necessary knowledge and skills.

In the direction of the findings obtained; it can be said that different activities and applications should be provided for student teachers in order to design and develop the use of smartphones in the teaching learning environment. Also facilities of additional education and personal development should be considered.

2) The second subproblem of the research: “Any significant difference among the opinions of student teachers on the usage, purpose, necessity and improvement of the use of smartphones in terms of university, gender, age and field/branch variables”. Related findings are given above.

2. 1. Findings related to university, gender and age variables

T-test results on the opinions of participant student teachers on the usage, purpose, necessity and improvement of the use of smartphones in terms of university, gender and age variables are given in Table 8.

Table 8. T-test results regarding the university, gender and age variables

Variables		N	\bar{X}	ss	sd	T	p
University	Düzce	314	3,31	,71	567	2,13	0,306
	Aksaray	255	3,19	,68			
Gender	Female	422	3,22	,70	567	-2,19	,619
	Male	147	3,37	,71			
Age	17-25	482	3,29	,70	567	2,96	,420
	26-35	87	3,05	,67			

*p<0,05

When we analyze the T-test results on the opinions of participant student teachers on the usage, purpose, necessity and improvement of the use of smartphones in terms of university, gender and age variables, it is seen that there is no difference according to these variables (p>,05). The fact that there is no significant different according to the variables can be interpreted as the smartphone usage is not affected by the university, gender and age variables in teaching-learning environments.

2. 2. Findings related to field/branch variable

One Way Anova Test was applied in order to determine whether the opinions of participant student teachers on the usage, purpose, necessity and improvement of the use of smartphones differ in terms of field/branch variable and the results are given in Table 9.

Table 9. One Way Anova results related to brach/field variable

Scale	Field/branch	N	\bar{X}	SS		K.T.	SD	K.O.	F	p	Difference
General Scale	(1) Turkish – Literature	142	3,07	,65	Intergroups	11,57		2,31 ,48	4,8	,00*	1,2,4,6, 3,4,6, 3-5 6
	(2) Psychological Guidance and Counselling	142	3,30	,74	Intragroup	270,98	5				
	(3) Classroom Teaching	100	3,44	,71		-					
	(4) Social Sciences	42	3,15	,76		-					
	(5) Foreign Language	43	3,49	,59		-					
	(6) Mathematics	100	3,23	,66		-					
Total						282,56					

*p<,05

When Table 9 is analyzed, One Way Anova Test was applied in order to determine whether the opinions of participant student teachers on the usage, purpose, necessity and improvement of the use of smartphones differ in terms of field/branch variable and the results demonstrates that there is a significant difference among the opinions ($p < .05$). As a result of the Tukey-b test to determine the source of the difference: The student teachers' opinions on the use of smartphone in teaching-learning environments differ according to the branches: (1) Turkish-Literature, (2) Psychological Guidance and Counselling, (3) Classroom Teaching, (4) Social Sciences, (5) Foreign Language, (6) Mathematics. The numbers of the student teachers are the ones that demonstrated significant difference.

2. 3. One Way Anova results of opinions on field / branch variables in terms of scale subdimensions

One Way Anova Test results on the opinions of participant student teachers on the usage, purpose, necessity and improvement of the use of smartphones in terms of field/branch variable are given in Table 10.

Table 10. One Way Anova results of opinions in terms of scale subdimensions

Dimension	Branch	N	\bar{X}	SS	K.T.	SD	K.O.	F	P	Difference	
(HTUS)	1) Turkish-Literature	142	3,59	,65	Intergroups	8,08	1,61	2,7	,018*	1, 2, 3, 4, 6	
	2) PGC	142	3,73	,74	Intragroups	330,66	,58				
	3) Classroom Teach.	100	3,83	,71	Total	338,75					
	4) Social Sci.	42	3,68	,76							
	5) Foreign Lang.	43	4,04	,5							
	6) Mathematics	100	3,70	,65							
(PANOS)	1) Turkish-Literature	142	3,27	,82	Intergroups	10,57	2,11	3,30	,06*	1, 2, 3, 4, 6 2, 3, 4, 5, 6	
	1) PGC	142	3,51	,81	Intragroups	360,27	,64				
	2) Classroom Teach.	100	3,62	,81	Total	370,56					
	3) Social Sci.	42	3,46	,79							
	4) Foreign Lang.	43	3,70	,72							
	5) Mathematics	100	3,49	,75							
(IOSU)	1) Turkish- Literature	142	2,34	,90	Intergroups	21,64	4,32	4,72	,00*	1-2, 4, 6, 2-5,6	
	2) PGC	142	2,66	1,00	Intragroups	516,03	,97				
	3) Classroom Teach.	100	2,86	,98	Total	537,68					
	4) Social Sci.	42	2,30	,94							
	5) Foreign Lang.	43	2,72	,91							
	6) Mathematics	100	2,51	,94							

* $p < .05$

When Table 10 is analyzed, it is seen that there is significant difference among the opinions of student teachers on the usage, purpose, necessity and improvement of the use of smartphones in terms of field/branch variable ($p < .05$). Differences are found in all dimensions and total points. According to the results of the Tukey-b test which was conducted to understand the source of the difference, mean and standard deviation of student teachers according to field variable are as follows: (1) Turkish-Literature, (2) Psychological Counselling and Guidance, (3) Classroom Teaching, (4) Social Sciences, (5) Foreign Language, (6) Mathematics. Their opinions are significantly different in these fields. When viewed in terms of average, the highest level of use is among students studying in the Foreign Language field (ATNK \bar{X} =4.04, ATKAG \bar{X} =3.70, ATKG \bar{X} =2.72). In the second place is the student teachers of Classroom Teaching (ATNK \bar{X} =3.83, ATKAG \bar{X} =3.62, ATKG \bar{X} =2.86). The averages of the views of the students of classroom teaching on improving the use of the smartphone in the learning-teaching environment are higher than the other groups. The lowest average among the groups belongs to the student teachers studying in Social Sciences (ATNK \bar{X} =3.68, ATKAG \bar{X} =3.46, ATKG \bar{X} =2.30). The cause of all these results needs to be studied. These results may be due to factors such as the smartphone technology that the students have, the economic level of the family, the proficiency to become a teacher, and the ability to transfer smartphone technology to learning-teaching environments.

Results, Discussion And Suggestions

The current research aimed to identify how student teachers use smartphones in learning-teaching environments, their intended purposes in using smart phones, and their perceptions on how to develop the use of smartphones in learning-teaching environments. Based on findings, the following results were obtained: Student teachers use smart phones in learning-teaching environments and they know how and why smartphones are used in learning-teaching environments. Also they frequently use smartphones. This result is the same as the result of Yildirim,

Yaşar and Duru (2016) "smartphones attract the attention of students". However, it is inconsistent with the view of Ağca and Bağcı (2013) that mobile devices have been seldomly used previously for teaching purposes. This situation may have been due to the fact that students confused what it means to use smartphones with educational purposes. Students may have also accepted smartphone usage outside of the subject course as an educational use. This situation can affect the learning-teaching process negatively, rather than contributing to this process. Student teachers' views on how to use a smartphone in learning-teaching environments are at a high level and their opinions on designing and developing their use are moderate.

The opinions of participant student teachers on the usage, purpose, necessity and improving and designing the use of smartphones according to the needs of education do not demonstrate any significant difference in terms of university, gender and age variables. However, their opinions differ according to field/branch variable. This result does not coincide with the results of the research carried out by Demircioğlu and Yadigaroglu (2011) stating that "there is no significant difference among the opinions of student teachers studying at different branches about information and communication technologies". This difference may be due to the research population and the methods used. It can be suggested that further research on the subject should be continued to clarify the situation. It seems that the smartphone is among the students in the field of Foreign Languages that has the highest level of use in the teaching learning process. Second place is the students of Classroom Teaching. In fact, the average of the opinions of the students in the classroom teaching field on improving the use of the smartphone in the teaching-learning environment is higher than the other groups. Among the groups, the use of the smart phone in learning-teaching environments is the lowest among the student teachers in the Social Studies field. The reasons for these results should be studied. Also, these outcomes may have stemmed from many variables such as the content of the ongoing program, the smartphone technology that the students have, the economic level of the families, the proficiency to become a teacher, and the ability to transfer smartphone technology to learning-teaching environments.

In line with the findings, for researchers; it may be advisable to carry out research that can be used to compare quantitative and qualitative research involving students and faculty members in each area / branch and that research on increasing the use of smartphones in learning-teaching environments and designing new applications to facilitate this usage should be conducted. For the application, it can be suggested that faculty members should be an example for the students using their smartphones for their educational purposes in their classes and that students who discover new ways and methods on the use of smartphones to be used in learning-teaching environments should be supported.

References

- Ağca, R. K. ve Bağcı, H. (2013). Eğitimde mobil araçların kullanımına ilişkin öğrenci görüşleri. *Eğitim ve Öğretim Araştırmaları Dergisi*, 2(2), 295-302.
- Alkan, C. (1997). Eğitim teknolojisi, Ankara: Anı Yayıncılık.
- Aşkar, P., Seferoğlu, S. (2006). Bilgi ve İletişim Teknolojileri. Ankara İlköğretim Genel Müdürlüğü, Okul Yönetimlerini Geliştirme Programı.
- Balay, R. (2013). Yönetimde Yaratıcılık. Yönetimde yeni yaklaşımlar (Editörler, Hasan Basri Memduhoğlu, Kürşad Yılmaz). Ankara: Pegem A Akademi.
- Büyüköztürk Ş., Akgün Ö.E., Karadeniz Ş., Demirel F. ve Kılıç E. (2016). *Bilimsel Araştırma Yöntemleri*. Ankara: Pegem Akademi Yayıncılık.
- Büyüköztürk, Ş. (2009). Sosyal bilimler için veri analizi el kitabı (10.Baskı). Ankara: Pegem A Akademi.
- Büyüköztürk, Ş. (2005). Anket Geliştirme. *Türk Eğitim Bilimleri Dergisi*,3(2), 133-151.
- Christensen, L.B., Johnson, R.B. & Turner, L.A. (2015). Research Methods Design and Analysis. (Çeviri Ed. A. Alpay). Ankara: Anı Yayıncılık.
- Demirci, K, Orhan, H. Demirtaş, A. Akpınar A. ve Sert, H. (2014). Validity and Reliability of the Turkish Version of the Smartphone Addiction Scale in a Younger Population. *Klinik Psikofarmakoloji Bülteni*, Cilt 24, Sayı3. www. Psikofarmakoloji. org. adresinden 20.03.2017 tarihinde indirilmiştir.
- Demircioğlu, G ve Yadigaroglu, M. (2011). Öğretmen Adaylarının Öğrenme-Öğretme Ortamlarında Bilgi ve İletişim Teknolojilerinin Kullanımına İlişkin Görüşleri. 2nd International Conference on New Trends in Education and Their Implications 27-29 April, 2011 Antalya-Turkey
- Göksoy, S. Yenipınar, Ş. (2017). Development of Usage of Smart Phones in Teaching-Learning Environments Scale. INTE. Editör: Aytekin İşman, Ahmet Eskicumali, Basım sayısı:1, Sayfa Sayısı 11, ISBN:2146-7358, (Yayın No: 3691582)
- Hızal, A. (1983), Uzaktan Eğitim Süreçleri ve Yazılı Gereçler, Ankara: Ankara Üniversitesi Eğitim Bilimleri Fakültesi Yayınları No 122.
- Kalaycı, Ş. (2008). SPSS Uygulamalı Çok Değişkenli İstatistik Teknikleri. Ankara: Asil Yayınları.
- Kaptan, S.(2000). Bilimsel Araştırma ve İstatistik Teknikleri. Ankara: Bilim Yayınevi.

- Karasar, N. (2005). Bilimsel Araştırma Yöntemi. Ankara: Nobel Yayın Dağıtım.
- Kaya, Z. (2006). Öğretim teknolojileri ve Materyal geliştirme. Ankara: Ankara: Pegem A Akademi.
- MEB. (2002). Eğitim teknolojisi kılavuzu, Ankara: EARGED.
- Özdamar, K. (2013). Paket Programlar İle İstatistiksel Veri Analizi. Ankara: Nisan Kitabevi.
- Şimşek, Ö. F. (2007). Yapısal eşitlik modellemesine giriş: Temel ilkeler ve LISREL uygulamaları. Ankara: Ekinoks.
- Tavşancıl, E. (2010). Tutumların Ölçülmesi ve SPSS ile Veri Analizi. Ankara: Nobel Yayın Dağıtım.
- Yahn, İ., H. (2003). Öğretim teknolojileri ve materyal geliştirme. Ankara: Nobel Yayıncılık.
- Yıldırım, A. ve Şimşek, H. (2005). Sosyal Bilimlerde Nitel Araştırma Yöntemleri. Ankara: Seçkin Yayıncılık.
- Yıldırım, K., Yaşar, Ö. ve Duru, M. (2016). Öğretmen ve öğrenci görüşleri temelinde akıllı telefonların eğitim öğretim ortamlarında kullanılmasının ve etkilerinin incelenmesi. Uluslararası eğitim, bilim ve teknoloji dergisi Cilt 2, Sayı 2, 72-84
- Yiğit, N., Bütüner S.Ö., ve Dertlioğlu, K. (2008). Öğretim Amaçlı Örütbağ Sitesi Değerlendirme Ölçeği Geliştirme. Necatibey Eğitim Fakültesi Elektronik Fen ve Matematik Eğitimi Dergisi (*EFMED*) Cilt 2(2), 38-51

Socialization Of Youth Into Historical Consciousness In The Czech Republic

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Abstract

This study presents results of qualitative research focused on transmission of historical consciousness to pupils and students on primary, secondary and tertiary levels of education. The study is based on data from 11 focus groups with 88 participants aged 12 - 25 which took place in late 2015 and early 2016. Analysis of the data was carried out according to the general coding paradigm. The study describes the modalities of historical consciousness transmission in four key socializing institutions: (1) non-formal intergenerational learning within family, (2) television broadcasting, (3) internet usage and (4) formal educational institutions. In this regard, the study supplements findings of existing research not only by describing the particular mechanisms of intergenerational transmission of historical consciousness, but it also demonstrates that a successful socialization into historical consciousness requires congruence of multiple institutions. Otherwise, a process of forgetting takes place.

Introduction

Since its formulation in the late 1980s in Germany and later in Scandinavia, the concept of historical consciousness has become a significant subject of international research in the domains of history didactics and understanding of the role history has in the everyday lives of pupils and students (Ahonen, 2005). A key contribution to establishing this subject's position was an extensive European-wide project Youth and History, which in 1995 and 1996 implemented a comparative survey among 15 and 16 year old Europeans (Angvik & Von Borries, 1997).

Various authors (Angvik & Von Borries, 1997, p. 36; Blanuša, 2005, p. 33) regard historical consciousness to represent a complex interconnection among interpretations of the past, perceptions of the present, and expectations of the future based on the existing knowledge of the past. In such a frame, historical consciousness serves to provide a temporal orientation in an individual's life and to form a historical identity (Rüsen, 2008).

Existing research in the domain of historical consciousness focuses on a number of phenomena which are located at the intersection of educational sciences and sociology. In this regard, researchers study (1) how the use of various didactic materials, especially textbooks, contributes to its formation (Ammert, 2010; Thorp, 2014), (2) the contents of historical consciousness of pupils and students (Seixas, 2006), (3) and the modalities of understanding the world based on historical consciousness (Rüsen, 2008).

In the case of Czech Republic, historical consciousness has become a subject of research only in the last decade (see e.g. Labischová, 2011, Labischová, 2012; Grácová & Labischová, 2012; Šubrt, 2010). We agree with Labischová (2012), that in the existing research two approaches can be distinguished: (1) educationally oriented and (2) socially oriented. The educationally oriented approach focuses on the way history is taught at schools and how are the latest findings about historical events presented to students. In this regard, Czech researchers have so far focused not only on inquiring about the educational content and information sources within history classes (Grácová & Labischová, 2012), but lately also on innovative didactic techniques aimed at development of history-informed thinking (Labischová, 2015). On the other hand, the socially oriented approach focuses on the descriptive characteristics of the Czech population, i.e. the results of its transmission. It also pays heightened attention to the attitudes of adults to history, evaluation of certain historical periods and also to social determinants of history interpretation (Pfeifrová & Šubrt, 2009, Šubrt, 2010; Šubrt, Vinopal & Vávra, 2013). It also seems that the approaches of international research of the subject correspond to the approaches described above.

Even though both approaches produced significant findings about historical consciousness of the Czech population and its formation by the educational system, we think that some important questions concerning the phenomenon have not yet been resolved. This is true especially of the *question of historical consciousness formation in the so-called "sensitive period"* (Schuman & Corning, 2000, p. 916) between the 14th and 25th year of life which is by many authors (Hart-Brinson, 2014; Kyoung & Hye-Kyung, 2015) regarded as key for development of this type of consciousness.

While the educationally oriented approach tackles this problem exclusively as a problem of transmission of historical consciousness in schooling institutions, the socially oriented approach takes the processes and mechanisms of transmission of historical consciousness to children and youth as granted; it assumes their existence instead of regarding them to be a subject of empirical investigation. In the first case, we lack a deeper understanding of *how is the historical consciousness in the form of particular symbolic representations of the past transmitted by various institution simultaneously*, that is, not only by school, but also by family, or by various kinds of media. Furthermore, the question is whether there exist relationships among these institutions, which could lead to intensification or attenuation of transmission of historical consciousness. According to many authors (Duquette, 2011; Rüssen, 2008, Thorp, 2014), the impact of family environment and other upbringing institutions can significantly influence the relationship to history and through that also influence the appropriation of knowledge within the educational system. In this regard, we attempt to broaden the findings of the educationally oriented approach by describing the mechanisms of transmission of historical consciousness in various institutions which are responsible for its development during adolescence. In other words, we study the social environment which affects the formation of historical consciousness of pupils and students in the Czech Republic. This environment is regarded as an important socialization agent also by authors in the field of social pedagogy (Kraus & Poláčková, 2001; Kraus, 2008).

In the case of socially oriented approach, *appropriation of historical consciousness in the course of the sensitive period*, during which children and youth form their relationship to history, interpretation schemes and basic political orientations (Alwin & Krosnick, 1991) is not properly elaborated. Because of that, the socially oriented approach is not able to explain why certain attitudes to history are present in the adult population.

We believe that the focus of this study on the mechanisms of transmission of historical consciousness to pupils and students will allow us not only to enrich the approaches empirically, but also to initiate their mutual interaction.

Methods

This research answers the call of several authors (e.g. Seixas, 2006, Rüssen, 2008, Labischová, 2011) for a more frequent use of qualitative methodology in the study of historical consciousness. In this regard, our intention was to study the ways in which pupils and students develop their historical consciousness about four particular symbolic representations of the past embodied by the following political events: (1) the terrorist attacks in New York on 11th September 2001, (2) the change of political regimes in Czechoslovakia in November 1989, (3) the events of August 1968 which culminated in the invasion of the armies of the Warsaw Pact to Czechoslovakia and (4) the communist coup d'état in Czechoslovakia in February 1948.

Informants from three levels of the educational system were selected for the purposes of the research: (1) elementary schools (IESCD 2) aged 12 – 14 (N = 21, 10 females, 11 males), (2) middle schools (IESCD 3) aged 17 – 20 (N = 46, 23 women, 23 men) and (3) universities (IESCD 6) aged 23 – 25 (N = 21, 10 women, 11 men). In total, 88 informants participated on this research project. Their selection was guided by two basic principles: first, it was aimed to cover all educational levels which correspond to the sensitive period (Schuman, Corning, 2000); second, it aimed at highest possible diversification of informants within the respective age groups. Because of that, at least two institutions differing by their specialization (technical, humanities) or character (vocational school, gymnasium) were selected at each educational level. The only exception to this concerns the level of elementary schools where we were able to develop cooperation only with a single school.

The data gathering for this research took place in late 2015 and early 2016. It was carried out through focus groups according to a single script executed by an interviewer (4 interviewers were involved in the research project). In total, 11 focus groups took place with participation ranging from 3 to 12 informants, having a character of discussion guided by half-structured script. The script was focused on the four historical events mentioned above, on the information sources that the informants used with regard to them, on the meaning the events have and on the ways of learning about them.

The transcribed material from focus groups was analyzed consistently with an approach known as the generic inductive qualitative model or as the general coding paradigm (Hood, 2014). We first carried out open coding of all of the transcribed material, while also making memos containing emerging interpretations and conceptualizations. Subsequently, we grouped the codes according to their topical affinities and generated four general categories which account for the processes of transmission of historical consciousness in the particular socialization institutions mentioned by the informants.

Results

We present our main findings by describing the respective socialization mechanisms embedded in four institutions that are formative of the historical consciousness of the interviewed students and pupils.

Family: parents and grandparents

Family members were among the most often stated sources of information with regard to the given historical events. In particular, the role of parent and grandparent narration constitutes one of the most important sources of information and attitudes toward the events. A more detailed look at the data reveals that there is a shift in that the parents of older students (tertiary level) narrate more often about older events from our script (August 1968, February 1948) than the parents of younger pupils. The same tendency is visible with regard to grandparents, although there is a difference in that parents tend to focus in their narration on their personal experience with the events, while grandparents tend to compare the periods more generally. From our data, it seems that grandparents are inclined to focus on the implicit question “What was it like to live at that time?”, while parents tended to narrate as if the question posed by their children was “What did you do when this event took place?” As a result, the information our informants had from grandparents were often concerned with meso- or macro-level conditions of life such as the feeling of certainty or the overall conditions of life. On the other hand, the information provided by parents were concerned with micro-level events – personal stories and biographical narration.

However, the narrations of parents and grandparents did not differ only with regard to content. They also differed with regard to the situations in which the narration took place, especially when taking into account what prompted the narration. Here, we must take into consideration the fact that it is not generally common that three generations share a household so that the narration of grandparents were limited to visits as opposed to everyday occasions for narrations of parents. However, during visits, grandparents do not need a specific prompt to begin with their narration. Our respondents characterized it in a way that their grandparents often “just told the story”. In contrast, when we focus on parent narration, we see that it usually takes place as a response to something. The impulses for narration take various forms such as direct questions asked by children, collective watching of television broadcasting (news, series, films, or even advertisements) which covers the given event, or celebration of anniversaries when the topic “is being talked about everywhere.” As a result, we can see that contact with children can be a sufficient prompt for grandparents to narrate, while for parents further prompts are needed to trigger narration.

Television

A second source of information permeating all cohorts was television broadcasting. As hinted above, this information source is also tightly associated with the role of parents as they are the ones controlling television while children are young and as parent’s narration is often triggered in a situation when the family gathers to watch television together. In television broadcasting, there are several types of content with varying relationships to the historical events we inquired about and to the mnemonic practices of our informants. There are television news which played key role for our older informants with regard to September 11th as they experienced this event through the means of television reporting. This mediation of the event resulted, as our informants reported, in vivid experience and a strong emotional response. Interestingly enough, what keeps the event in the everyday consciousness of our informants is not the emotional experience itself, but the issue of trustworthiness of information regarding the event. While some of the informants believe that they will never be certain about what really happened and resign to reach a conclusion, the problem of trustworthiness motivates others to actively seek further information and discuss them with their peers.

However, television news are not relevant only with regard to events that took place during the lifetimes of our informants. They also mediate other current events such as anniversary commemorations or events that are by our informants associated with the original historical events such as current terrorist attacks, which are associated with the perceived discontinuity of September 11th, or domestic political problems associated with the unfulfilled potential of 1989. In this way, television news keep some of the more recent events – which are commemorated or are seen as a beginning of current type of events – in everyday consciousness of our informants.

There are also television series covering some or most of the events we examined. Most notably, there is a series called “Vyprávěj” (which could be translated as “Tell us Your Story”) which narrates the life experience of one generation since the 1950’s to present and therefore serves as a source of information and as a prompt for narration for multiple historical events. Furthermore, films are most commonly cited with regard to 1968 as this event is, according to our informants, “heavily covered by films.” We could even argue that for our informants, films are the most significant source of information with regard to 1968 as they provide information and “feeling” for an event that is “definitely part of history” for them. Finally, we found out that even advertising has a mnemonic

potential. Our informants repeatedly pointed to an advertisement for one of the largest Czech banks. The ad attempted to emphasize the long tradition of the banking institution (it celebrated 190 years of existence) and so it depicted by animation the crucial events of the 20th century.¹ In this way, it was able to keep reminding our informants of the events we were examining.

Internet

A third source of information present at all three educational levels were websites, streaming services and social networks accessible through internet connection. Although internet as an information source was talked about very often during focus groups, closer inspection reveals that most of the options it provides are considered only potentially (as an answer to the question about how would informants gather further information), while the actual practice seems to consist of frequent visits to few selected websites, which only have limited potential of informing their visitors about historical events (e.g. during anniversary). As a potential source of information on the internet, our informants listed a broad range of websites such as Wikipedia, search engines (Google, Seznam.cz) or video streaming sites (YouTube, stream.cz). On the other hand the set of websites representing actual sources of information was much more narrow – it involved home pages, news sites and social networks. Furthermore, our informants usually were not able to describe their use of this medium beyond the first step of going to some of the listed pages. While one could see this as an indication of interactivity of the Internet as a medium, we also see that as an indication of absence of a stable mnemonic practice established around the Internet use.

School

A fourth stable source of information was school. In one way or another, this information source was present with regard to all examined historical events. Except for September 11th, the events were part of standard school curriculum and so information were often gathered from textbooks and teaching (although some informants reported that in their history classes, they never covered history more recent than World War II.). In some cases, our informants reported that their teachers told them about some of the events regardless of the subject they taught. In this sense, school is an actual source of information for our informants. Yet in the interviews, school also represents a potential source of further information – informants would often opt to consult their teachers (especially if the teachers talked about the event during classes) together with searching on the internet or asking their parents. This option, however, is no longer present at the tertiary level of education.

However, our analysis suggests that school cannot be seen as a self-sufficient source of information about the past. With regard to older events that we examined (August 1968 and February 1948), school usually represents the first and dominant source of information because these events appear sporadically in other sources (the only exception is the existence of numerous films depicting the events of August 1968 mentioned earlier). And it is precisely in these situations, when school is not accompanied by other information sources, that our informants begin to exhibit vague knowledge of the events, or even explicitly report forgetting. As a result, it seems that transmitting knowledge about historical events cannot be achieved by a single institution, even though it is the one most specialized in education.

Discussion

To summarize our findings, we point out that the core structures forming historical consciousness are constituted by family (parents and grandparents), school (curriculum and especially teacher narration) and audiovisual media (television and internet). In this regard, our findings are consistent with the theoretical assumptions about key factors influencing historical consciousness (see Grácová & Labischová, 2012; Labischová, 2011). However, the role of Internet, although mentioned quite often, seems to consist largely of a potential information source with no specific mnemonic practices related to it.

Despite their purpose, a number of educational internet platforms, which were lately established in order to educate about the second half of the 20. century (see e.g. DSTR, 2017, CZ3889, 2017), do not constitute a relevant source of information for our informants. We believe that this state resulted from an absence of their promotion during history classes, which is consistent with a relatively low level of attention paid to the political events of the second half of the 20. century on all levels of the educational system (see e.g. Labischová & Grácová, 2011; Labischová, 2012).

¹ The advertisement was also uploaded to Youtube by an official account of the institution. It is accessible here: <https://www.youtube.com/watch?v=y2hiE6B4nvE>.

Another important point that our data showed is that practices surrounding other information sources we elaborated imply a certain interconnectedness: parents control the television program to be watched and they also narrate in reaction films and series they often watch with their children; teachers narrate during anniversaries of significant events which resonate through the media. Furthermore, the interconnectedness is most visible when only one information source remains in the situation of remembering. In our case, it was the school providing information about some of the older events. In such a situation, knowledge transmission becomes problematic and the resulting historical consciousness is vague and fragmented. Consequently, it seems that to talk about the structures forming historical consciousness (or even study them) as separate entities is a simplification limiting our knowledge about the phenomenon. We hope to have demonstrated that the distinction between them is of analytical nature rather than ontological.

Overall, we can see that with regard to formation of historical consciousness of pupils and students in the Czech Republic, a continuous and simultaneous influence of multiple institutions is of vital importance. Influence of a single educational institution does not seem to be enough for the pupils and students to appropriate a “coherent” historical consciousness about the given events, or even to become part of their “historical identity” (Rüssen, 2008). The formation of historical consciousness is supported by influence of multiple institutions, a wider educational environment as defined by Kraus (2008).

According to what our informants reported, it seems clear that historical consciousness becomes more articulated either overall with higher age of the participants or for particular events depending how close they are to their year of birth. This finding is especially relevant for the two most recent events in the focus group script (November 1989 and September 11th 2001) which from the perspective of our informants have the strongest consequences for their everyday life and for their future. The didactics of modern history should emphasize also the consequences of older historical events for the current and future life of pupils and students if the aim is for these events to become a larger part of their historical consciousness.

Conclusion

Our findings provide evidence that effective transmission of historical consciousness requires congruence of multiple institutions. Nevertheless, as the statements of our informants referring to the event of September 11th illustrated, the transmission does not necessarily have to be consensual, that is, socialization may involve contradictory information and narratives. If some of the socializing institutions (e.g. family or media) provide interpretations of history that are substantially different to the ones provided by other institutions, informants may exhibit higher reflexivity with regard to given historical events, may use more sources of information and may even bear a more intensive interest in history overall. This finding relates to the works of Duquett (2011) and Rüssen (2008) who claim that differing interpretations of history among school and other institutions affect negatively the appropriation of the official version of history. However, such cases of incongruence may not be seen only in a negative light. Our data suggest that these cases may lead also to higher reflexivity of the actors and to intensification of their cognitive development (Kaufman & Baer, 2006). It could then be the task of pedagogues to support the reflexivity and to guide it by cultivating critical ways of thinking about history. To be sure, a deeper understanding of the relationship between incongruent socialization content and the extent of reflexivity of pupils and students clearly requires further research.

References

- Ahonen, S. (2005). Historical consciousness: A viable paradigm for history education? *Journal of Curriculum studies* 37 (6), 697-707.
- Ammert, N. (2010). To bridge time: Historical consciousness in Swedish history textbooks. *Journal of Educational Media, Memory, and Society* 2 (1), 17-30.
- Angvik, M. & Von Borries, B. (1997). *Youth and History. A Comparative Survey on Historical Consciousness and Political Attitudes among Adolescents*. Hamburg: Körber-Stiftung.
- Alwin, D. F. & Krosnick, J. A. (1991). Aging, Cohorts, and the Stability of Sociopolitical Orientations over the Lifespan. *American Journal of Sociology*, 97 (1), 169-195.
- Blanuša, N. (2005). Historical Consciousness of Young People in Europe at the Turn of the Millennium. *Politická misao*, 42 (5), 31-54.
- CZ3889. (2017). *Československo 38-89*. Dostupné na adrese: <http://www.cs3889.cz/>
- Duquette, C. (2011). *Le rapport entre la pensée historique et la conscience historique. Elaboration d'un modèle d'interprétation lors de l'apprentissage de l'histoire chez les élèves de cinquième secondaire des écoles francophones du Québec*. Québec: Université de Laval.
- Grácová, B. & Labischová, D. (2012). Současná teorie a praxe dějepisného vzdělávání na školách. *Pedagogická*

- orientace*, 22, (4), 516-543
- Hart-Brinson, P. (2014). Discourse of generations: The influence of cohort, period and ideology in Americans' talk about same-sex marriage. *American journal of Cultural Sociology*, 2 (2), 221-252. Doi: 10.1057/ajcs.2014.3
- Hood, J. D. (2014). Orthodoxy vs. Power: The Defining Traits of Grounded Theory. In Clarke, A. E.; Charmaz, K. (2014). *Grounded Theory and Situational Analysis. Volume I. History, Essentials and Debates in Grounded Theory* (pp. 105–119). London: Sage.
- Kaufman, J. C. & Baer, J. (Eds.). (2006). *Creativity and Reason in Cognitive Development*. Cambridge: Cambridge University Press.
- Kraus, B. (2008). *Základy sociální pedagogiky*. Praha: Portál.
- Kraus, B., & Poláčková, V. (Ed.). (2001). *Člověk – prostředí – výchova: K otázkám sociální pedagogiky*. Brno: Paido.
- Labischová, D. (2011). Empirical Research on Historical Consciousness in History Didactics, its Possibilities and Perspectives. *The New Educational Review*, 25 (3), 260-269.
- Labischová, D. (2012). Factors Shaping the Historical Consciousness of Pupils, Students, and Teachers in Czech Schools. *The New Educational Review*, 26 (3), 148-161.
- Labischová, D. (2015). Možnosti využití metody eyetrackingu ve výzkumu kompetencí historického myšlení na příkladu analýzy ikonografického pramene – karikatury. *Pedagogická orientace*, 25 (2), 271-299
- Ma, Kyoung Hee – Kim, Hye Kyung [2015]. Collective Memory and Formation of the “Uncosscious” Political Generation: Focusing on the Former Period Baby Boomers in Korea. *Development and Society* 44 (1): 77-106.
- Pfeiferová, Š. & Šubrt, J. (2009). Veřejné mínění o problematice českých dějin. *Naše společnost*, 7 (2), 16-23.
- Seixas, P. (Ed.). (2006). *Theorizing Historical Consciousness*. Toronto: University of Toronto Press.
- Schuman, H. & Corning, A. D. (2000). Collective Knowledge of Public Events: The Soviet Era from the Great Purge to Glasnost. *American Journal of Sociology*, 105 (4), 913-956.
- Rüssen, J. (2008). *History: Narration, Interpretation, Orientation*. New York: Barghahn Books.
- Šubrt, J. (Ed.). (2010). *Historické vědomí jako předmět badatelského zájmu: teorie a výzkum*. Historická Sociologie, Kolín: Nezávislé centrum pro studium politiky.
- Šubrt, J., Vinopal, J. & Vávra, M. (2013). Czechs and their View of History. *European Societies*, 15 (3). <http://dx.doi.org/10.1080/14616696.2013.840735>
- Thorp, R. (2014). Historical Consciousness and Historical Media – A History Didactical Approach to Educational Media. *Education Inquiry*, 5 (4), 497-516.
- DSTR. (2017). *Ústav pro studium totalitních režimů*. Dostupné na adrese: <https://www.ustrcr.cz/>

Sociological Profile Of Subscribers Of The Jazz Bulletin Of The Jazz Section Of The Union Of Czechoslovak Musicians

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Abstract

Jazz is one of the basic types of non-artificial music. Non-artificial music is a relatively autonomous developmental sphere of the European music culture, formed since the 19th century and developing specific features and internal differentiation in the course of the 20th century. The Jazz Section of the Union of Czechoslovak Musicians (hereinafter just “JS”) was a very important and unique part of cultural life in Czechoslovakia of the latter half of the 20th century. Despite the difficulties brought by the normalisation period the JS was a very active organiser, methodologist and publisher. One of the fundamental publication outcomes was represented by the publication of the periodical for JS members called *Jazz Bulletin of the Jazz Section* (hereinafter just “JB”). The main purpose of my research was to record interviews with the key representatives of the JS and analyse types of JB subscribers on the basis of sociological categories by the methods semi-structured interview and semi-structured questionnaire.

Introduction

The origin and the whole period of existence of the JS fall within the period of “normalisation”. Normalisation is the stage of Czechoslovak history between April 1969 and November 1989, characterised by gradual suppression of the democratisation processes and reform efforts of the sixties and renewal of full Communist power. Thus not only the area of art but also all other areas of human activity in the country were subject to attributes like controlled censorship, cancellations and bans of various organisations, moral decay and repression. Musical life of the time was developing along three lines: the official music scene, the grey zone and the illegal - underground - music.

Jazz Section Of The Union Of Czechoslovak Musicians

The JS existed between the years 1971-1987. In that period the JS had over eight thousand official members. Its key personalities were Karel Šrnp, Vladimír Kouřil, Josef Skalník, Čestmír Huňát and Tomáš Křivánek.

In October 1971 the constituting conference of Jazz section of the union of Czechoslovak musicians created the organisation. In the same year the Ministry of the Interior approved establishment of the Jazz section of the union of Czechoslovak musicians as a special-interest organisation, albeit without full autonomy. The JS as a special-interest organisation therefore belonged to the Union of Czechoslovak Musicians (Kouřil, 1999, p. 14-20).

The Union of Czechoslovak musicians was dissolved by the Ministry of Culture’s administrative act in 1984 including the organisations associated with it, one of them being the JS. Continuation of the JS activity would have made it an illegal organisation. The courage, activity and conviction of its members meant that, despite the complex and dangerous situation, the JS continued its activity, joining the grey zone of the period culture. The representatives of the grey zone were neither the official scene nor the underground but moved along its thin borderline.

In the beginning the JS was exclusively jazz oriented. In connection with the cultural development and establishment of new music genres the originally purely jazz orientation of the section began to widen. The main goals of the Jazz Section included support and encouragement of interest in jazz music in Czechoslovakia, which was reflected by its extensive organisational, concert and publication activities (Švoncová, 2013, p. 11).

Concert organisation activity was the focus of the JS’s attention until the issue of the order of restriction and ban of these activities. In the years 1974-1979 the JS organised nine of the originally planned eleven music festivals titled *Prague Jazz Days* (hereinafter just “PJD”). The tenth and the eleventh editions of PJD were already banned by the authorities. The first edition, spanning across two days, developed into an eleven-day festival over the years. The PJD by its time scope, musical content (traditional jazz, modern jazz, rock, jazz-rock, alternative, punk, music experiments, etc.) as well as visitor rates outgrew all other music festivals held in Czechoslovakia up to that time. Major unofficial events organised by the JS also included a performance of the American avant-garde theatre ensemble, the *Living Theatre*, taking place on 12 October 1980.

After the banning of the concert organising activity the focus of interest of the JS moved to publication. Thanks to the omnipresent systematic censorship the situation was not favourable in this area either.

All printing that was not officially censored and approved was illegal. The textual and the graphic components were subject to compulsory official approval. The texts were first auto-censored, then censored and finally censor supervised by an official or political institution. The graphics of every envelope or poster had to be officially released. For the publication activity of the Jazz Section not to step beyond the boundaries of legality, all its

publications were declared supplements to its membership periodical or publications of a special-interest club, which did not require official supervision, censorship and approval (Kouřil, 1999, p. 247).

The rich publication activities of the JS were headed by the *JB periodical for JS members*, and included bulletin 43/10/88 and *Diskorama*, separate editions *Jazzpetit* and *Situace* and a series of books on music, literary, art, history of culture and philosophy themes. The major ones include publication of the novella by Bohumil Hrabal *Obsluhoval jsem anglického krále [I Served the King of England]*.

This wide spectrum of activities made the JS unique in the Czechoslovakia of the normalisation period. Despite that all five leading personalities of the JS were followed by the period regime, accused of illegal business, sentenced and imprisoned in 1986. Court rehabilitation of the JS only put things right in 1991.

Jazz Bulletin

The major publication activity of the JS was represented by the *Jazz bulletin* periodical for JS members (hereinafter just "JB"). In the years 1972-1982 all regular members of the JS subscribed to the JB and the JS issued 28 issues in irregular intervals.

In the beginning, the membership-oriented periodical, JB, like the JS, was strictly jazz-oriented. As time passed its music spectrum extended to rock, jazz-rock, the alternative music scene or contemporary music in general. In addition to music themes the bulletin also began to publish articles on film, theatre, rock - classical music syntheses, punk, electronic and minimalist music, ethnic music and fine arts. This wide scope is proof of the absolute uniqueness of this periodical in the Czechoslovakia of 1980s and 1990s.

Research

The object of my research included key personalities of the JS and former JS members - subscribers of JB. The subject was the JB periodical for JS members. The chosen research methods included semi-structured interview and semi-structured questionnaire.

The interview research method allowed obtaining unique data from the key representatives of the JS themselves. I recorded the observed phenomena by means of audio-recordings, video-recordings and a record sheet. The results were analysed by means of qualitative analysis, transcript, first-order reduction, coding, timeline work, clustering, and the contrasting and comparison method.

The questionnaire research method allowed accumulation of information about former members of the JS at the time of their subscribing for the JB periodical and now and comparison of the past and present situation data. The first stage of the specific investigation has lasted for 4 months so far. Material collection and research result analysis combined quantitative and qualitative design and used contingency tables, tables of absolute and relative frequencies and bar charts of relative frequencies.

The interview of Vladimír Kouřil as a key personality of the JS was held in Prague on 5 May 2018.

The interview of Josef Skalník as another key personality of the JS was held in an art studio in Prague on 12 May 2018.

Further interviews with the other key personalities of the JS are included in the next research stage schedule.

The questionnaire was compiled in the course of methodology preparation and final research instrument preparation, which took one month.

The interview with Vladimír Kouřil crystallised into cooperation in the form of professional patronage over the questionnaire which facilitated its sending to 98 former JS members and implementation of the research among them. The questionnaire return rate in the first research stage was 35 active respondents.

The main purpose of the research was to record interviews with key JS representatives, analyse types of JB subscribers by sociological categorisation and compare their music preferences at the time of their subscriptions and today for compilation of their sociological profile. The basic working hypothesis was that the subscribers of the JB membership periodical have the same music preferences today as they had at the time of their JB subscription.

Questionnaire

A questionnaire is one of the most common research techniques where the respondents answer the posed questions in writing. The main purpose of the questionnaire is accumulation of information about the respondents, their opinions and attitudes to a certain theme. The questionnaire, unlike the other research techniques, uses the form of written answers (Pelikán, 2011, p. 104-105).

The target group of the questionnaire research was former members of the JS - subscribers of the JB periodical for members. The questionnaire itself focused on sociological categories including gender, age, education, place of residence, music preferences at the time of JB subscription and at present. The questionnaire included twenty-two non-parametric closed (multiple-choice), semi-open and open questions. The closed questions asked about

numerical, geographical and other data and the respondent had to choose one of the offered variants. The semi-open questions also offered response variants but provided space for specification of the chosen variant. Open questions provided the respondents with unlimited space for their own formulations. The statistical processing of non-parametric questions was based on establishment of absolute and relative values as this type of questions cannot be processed by standard statistical procedures (Pelikán, 2011, p. 109). Open questions were processed by sensible categorisation.

Question 1

VARIANT	FREQUENCY	%
male	32	91.4
female	3	8.6
total	35	100

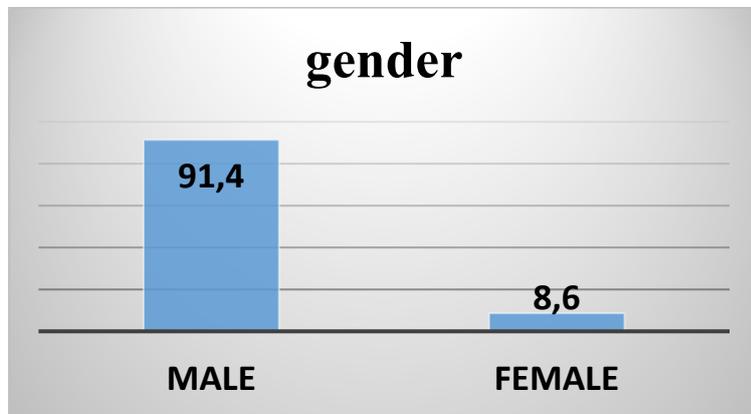


Figure 1, table 1: The opening closed question concerned the gender of the respondents. The table of absolute and relative frequencies and the bar chart of relative frequencies show that the first research stage included 8.6% female and 91.4% male respondents.

Question 2

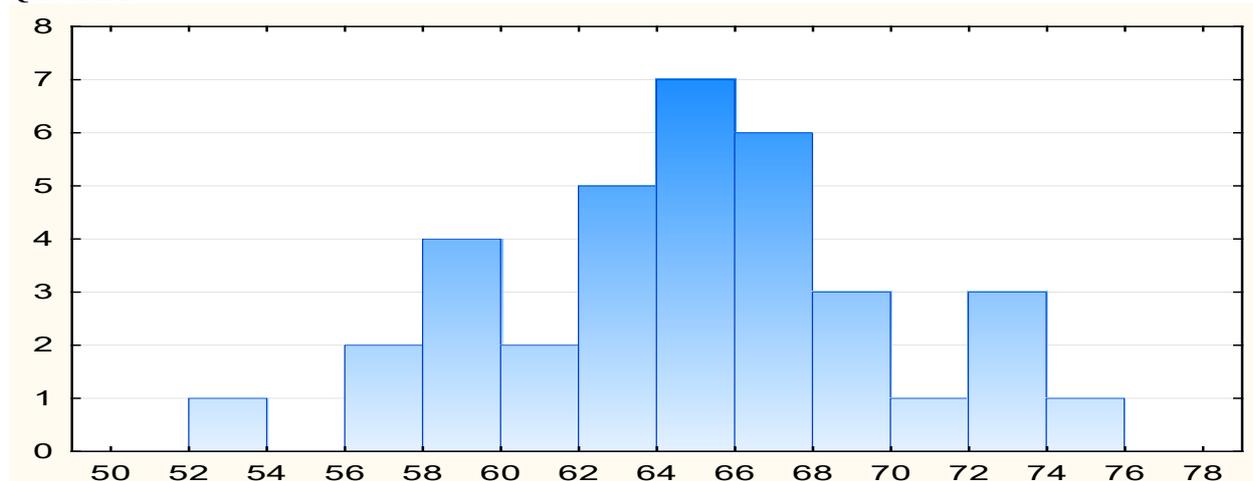


Figure 2: The second closed question focused on the age of the individual respondents. The bar chart of absolute frequencies showed that the youngest of the addressed respondents was 53 and the oldest 75 years old. Most respondents were 65 years old.

Question 3

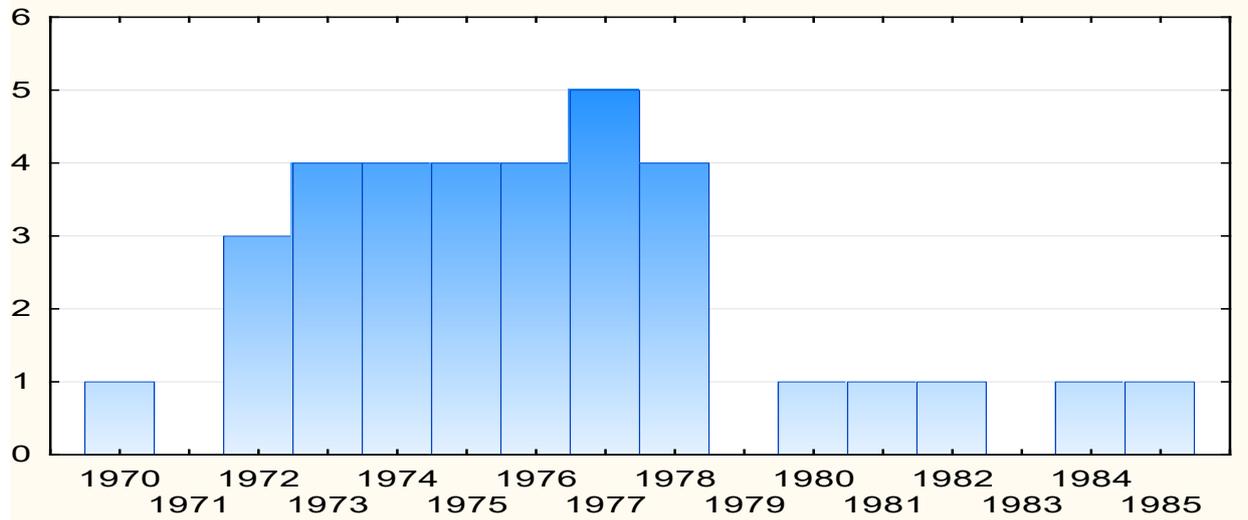


Figure 3: The third closed question mapped the year of joining the JS by the individual respondents. Most of the respondents (14.3%) became JS members in 1977. (11.4% of the respondents joined the JS in the years 1973-1976 and in 1978 and 8.6% entered the JS in 1972.

Question 4

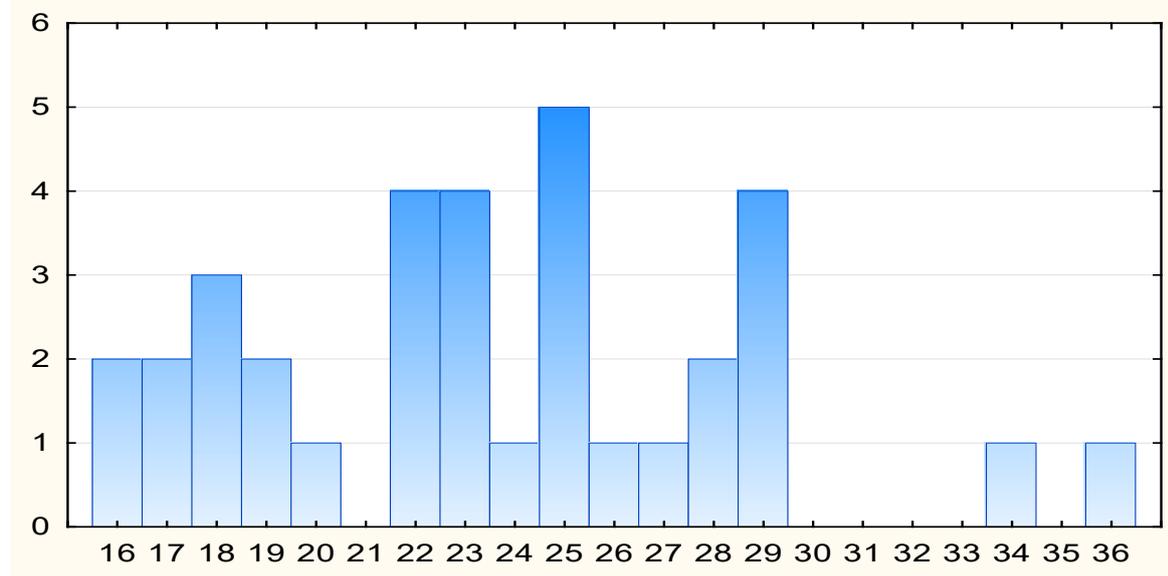
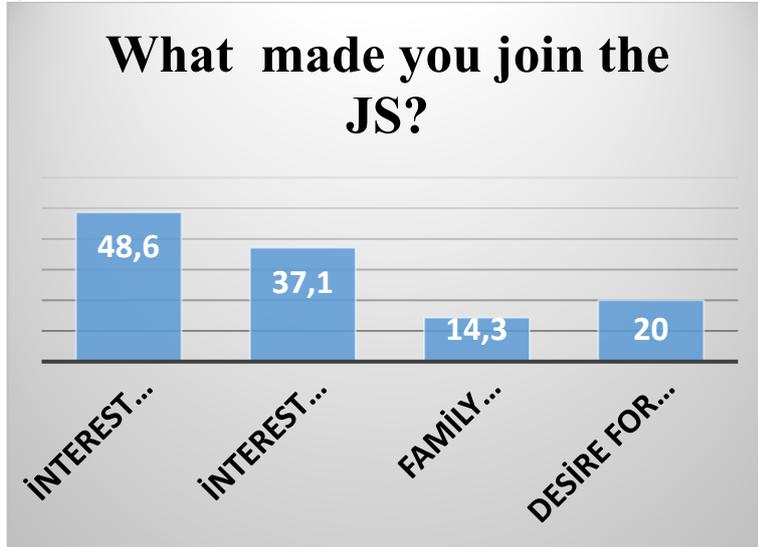


Figure 4: The fourth closed question asked about the age of the respondents on entering the JS. Most JS members joined the Jazz Section at the age of 25 (14.7%), and 11.8% became JS members at the age of 22-23 and 29 years. The youngest respondent was 16 on entering the JS and the oldest member was 36 when joining the JS.

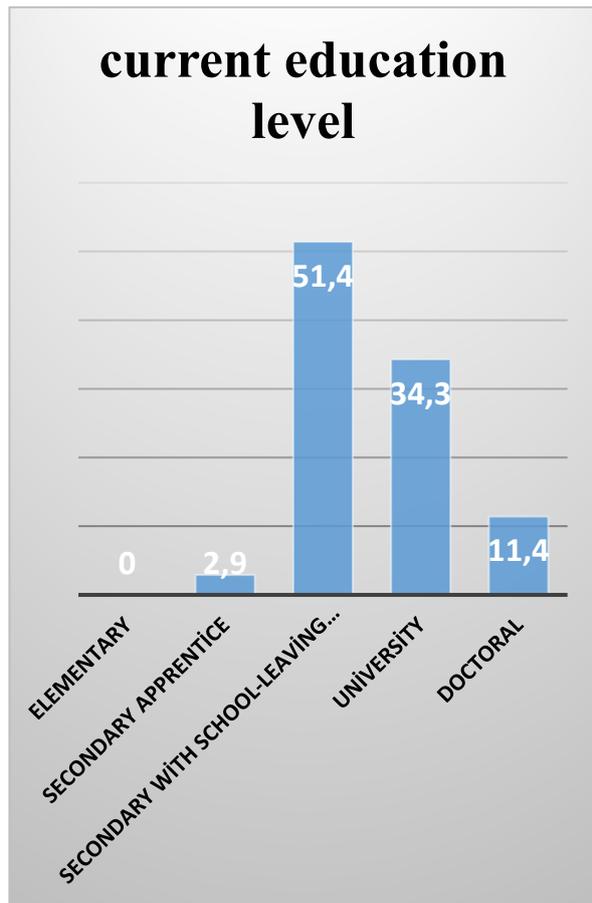
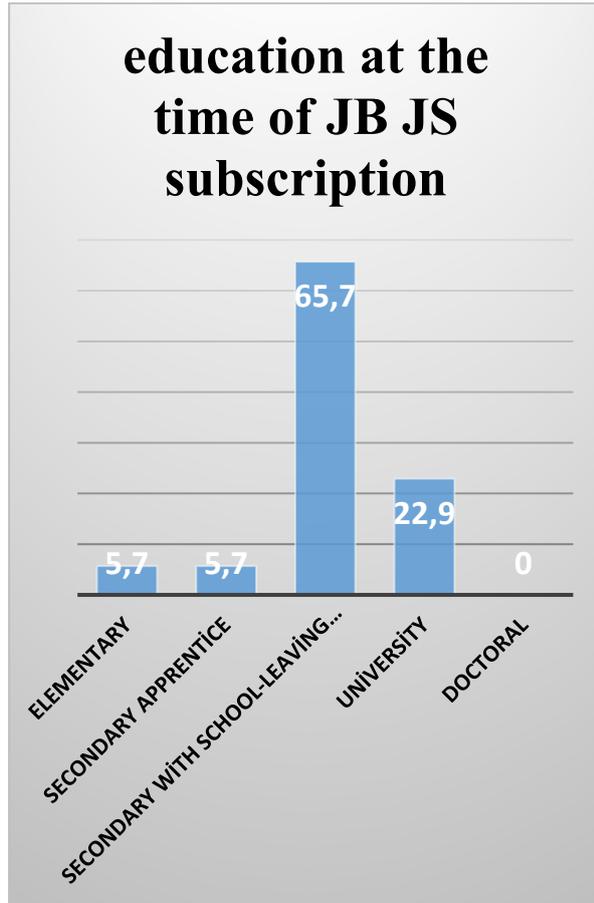
Question 5



VARIANT	FREQUENCY	%
interest in music	17	48.6
interest in culture and art	13	37.1
family and friends	5	14.3
desire for knowledge and freedom	7	20

Figure 5, table 2: The open question asked the respondents what made them join the JS. The table of absolute and relative frequencies and the bar chart of relative frequencies show that most of the respondents joined the JS because of their interest in music, the specifications giving jazz music as the more specific answer to this question in most cases. The lowest number was represented by respondents motivated to join the JS by their family and friends.

Questions 6 And 7



PIVOT TABLE 3			
EDUCATION AT THE TIME OF JB JS SUBSCRIPTION	%	CURRENT EDUCATION LEVEL	%
elementary	5.7	elementary	0
secondary apprentice	5.7	secondary apprentice	2.9
secondary with school-leaving examination	65.7	secondary with school-leaving examination	51.4
university	22.9	university	34.3
doctoral	0	doctoral	11.4

Figures 6, 7, table 3: The sixth and the seventh question mapped the levels of achieved education of the respondents at the time of their JB subscription and at present. No respondent was a doctoral graduate at the time of his/her JB subscription. Most respondents were secondary school graduates with passed school-leaving examination then and now as well (65.7% and 51.4%, respectively), followed by university graduates (22.9%). At present 11.4% of the former JS members are doctoral graduates.

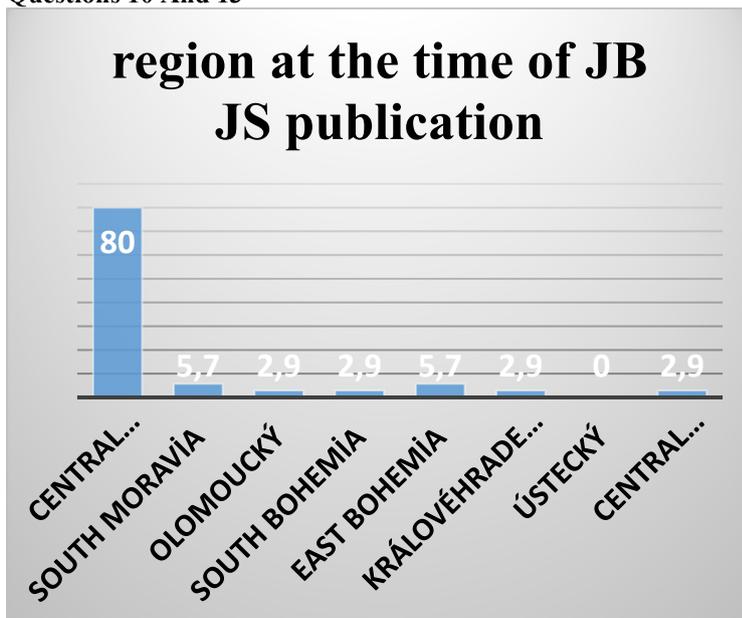
Questions 8 And 9

PIVOT TABLE 4			
JS PERIOD PROFESSION	%	CURRENT PROFESSION	%
student	27.27	old-age pensioner	23.91
musician	9.09	musician, composer	13.04
designer	9.09	self-employed	8.70
graphic artist	6.82	academic worker	6.52

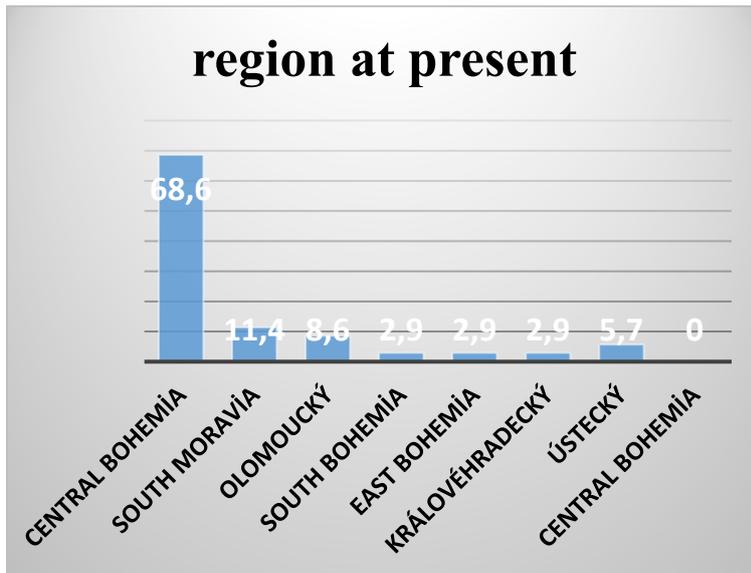
assistant	4.55	music editor	6.52
labourer	4.55	painter/graphic artist	6.52
physician	2.27	producer	6.52
designer	2.27	teacher	4.35
soldier	2.27	translator	4.35
printer	2.27	designer	4.34
translator	2.27	physician	2.17
boiler man	2.27	lawyer	2.17
engineer	2.27	data centre manager	2.17
forewoman	2.27	journalist	2.17
animal husbandry advisor	2.27	lecturer	2.17
librarian	2.27	train dispatcher	2.17
american information agency	2.27	astrologist	2.17
teacher	2.27	-	-
american embassy in Prague	2.27	-	-
train dispatcher	2.27	-	-
machine adjuster	2.27	-	-
guard	2.27	-	-
factory planner	2.27	-	-

Table 4: The eighth and the ninth open questions dealt with professions and professional activities of the respondents at the time of their JB subscription and now. Most respondents were still students at the time of their JB subscription. A lot of them were active in the music sphere or worked as designers, painters or graphic artists. At present most respondents are old-age pensioners; a large number of them are still active in the field of music, business, academic work, music editing, painting, graphic art or production.

Questions 10 And 13



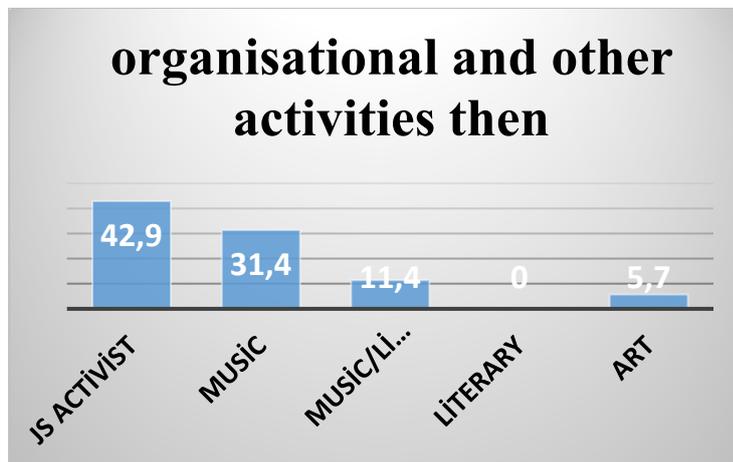
VARIANT	FREQUENCY	%
Central Bohemia	28	80
South Moravia	2	5.7
Olomoucký	1	2.9
South Bohemia	1	2.9
East Bohemia	2	5.7
Královéhradecký	1	2.9
Ústecký	0	0
Central Bohemia	1	2.9



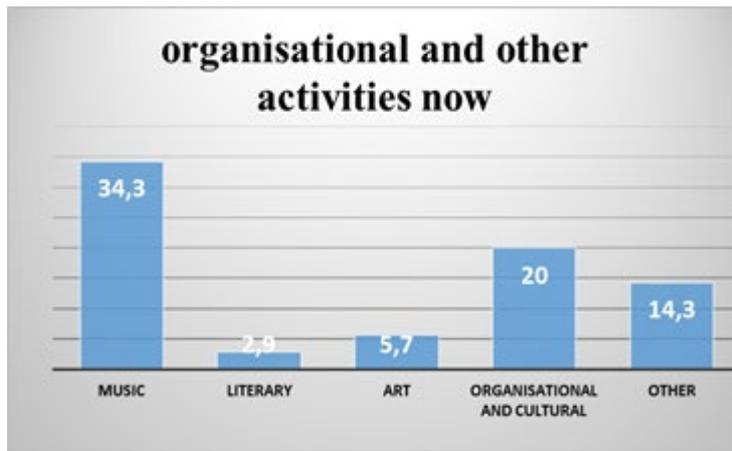
VARIANT	FREQUENCY	%
Central Bohemia	24	68.6
South Moravia	4	11.4
Olomoucký	3	8.6
South Bohemia	1	2.9
East Bohemia	1	2.9
Královéhradecký	1	2.9
Ústecký	2	5.7
Central Bohemia	0	0

Figures 8, 9, tables 5, 6: The tenth and the thirteenth questions were aimed at the region where the respondents lived at the time of JB subscription and where they live now. Most of the respondents (80% and 68.6%, respectively) were and are living in Central Bohemia Region, most often in Prague.

Questions 11 And 12



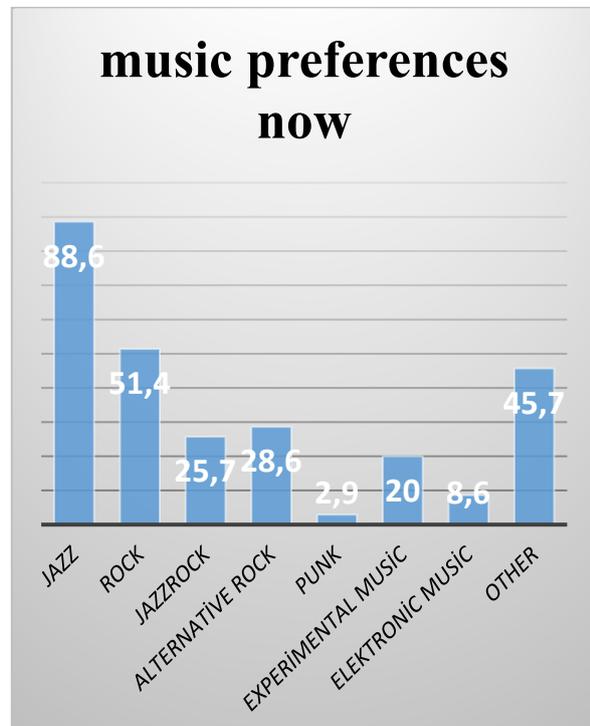
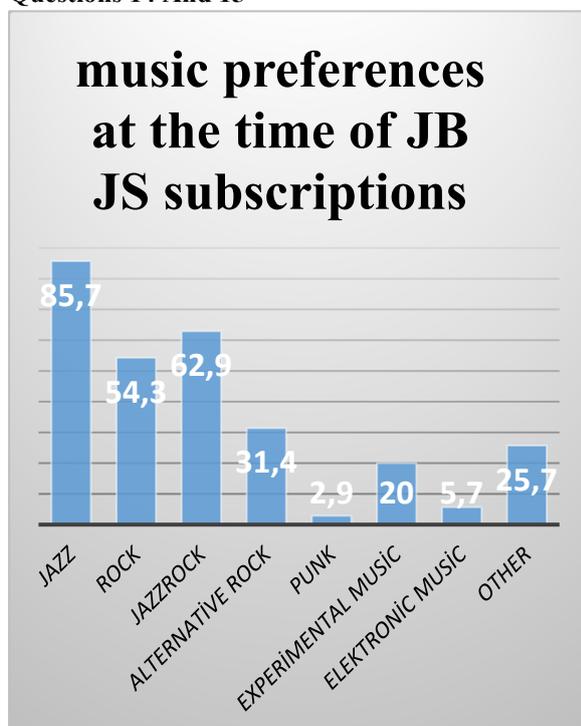
VARIANT	FREQUENCY	%
JS activist	15	42.9
music	11	31.4
music/literary	4	11.4
literary	0	0
art	2	5.7



VARIANT	FREQUENCY	%
music	12	34.3
literary	1	2.9
art	2	5.7
organisational and cultural	7	20
other	5	14.3

Figures 10, 11, tables 7, 8: Open questions eleven and twelve dealt with past and present organisational and other activities of the former JS members. At the time of JB subscription most respondents were active around the JS (42.9%), followed by music-related activities (31.4%). At present music-related activities obtained 34.3% and organisational and cultural activities 20%.

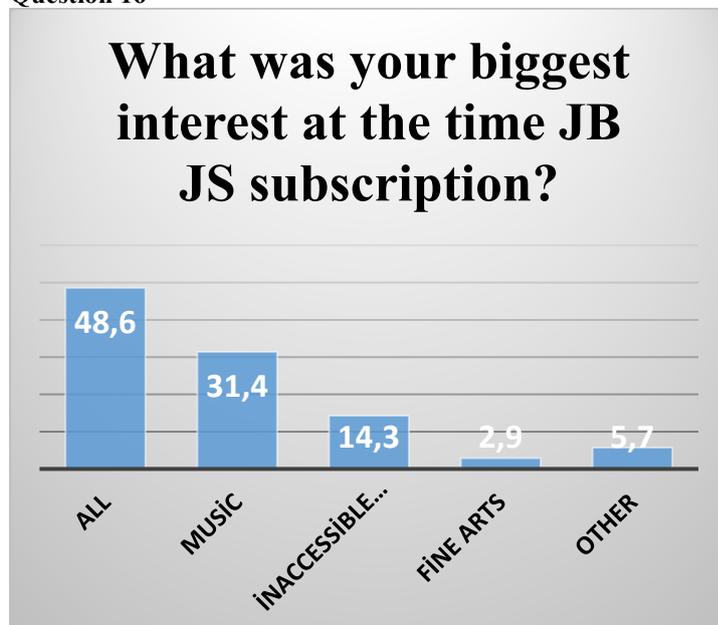
Questions 14 And 15



PIVOT TABLE 9			
MUSIC PREFERENCES THEN	%	MUSIC PREFERENCES NOW	%
jazz	85.7	jazz	88.6
jazz-rock	62.9	rock	51.4
rock	54.3	other	45.7
alternative rock	31.4	alternative rock	28.6
other	25.7	jazz-rock	25.7
experimental music	20	experimental music	20
electronic music	5.7	electronic music	8.6
punk	2.9	punk	2.9

Figures 12, 13, table 9: The fourteenth and fifteenth semi-open questions grasped a complete survey of music preferences of former JS members at the time of JB subscription and now. Out of the eight music categories five remained in the same order as at the time of the periodical subscription. Only three categories changed their rank.

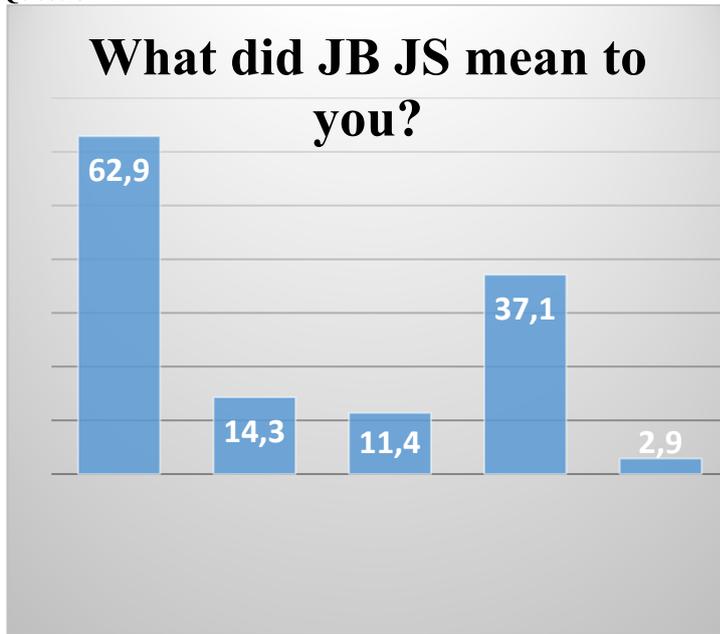
Question 16



VARIANT	FREQUENCY	%
all	17	48.6
music	11	31.4
inaccessible informations	5	14.3
fine arts	1	2.9
other	2	5.7

Figure 14, table 10: The sixteenth open question mapped the preferred interests of the respondents in terms of the JB contents. The above bar chart of relative frequency and the attached table of absolute and relative frequencies show that nearly one half (48.6%) of the respondents were interested in the complete contents of the periodical. Selective preferences mainly included music (31.4%) and information not elsewhere available (14.3%).

Question 17



VARIANT	FREQUENCY	%
source of information	22	62.9
source of recordings	5	14.3
inspiration on for foreign language learning	4	11.4
existension of cultural outlook	13	37.1
fine art knowledge	1	2.9

Figure 15, table 11: The open question number seventeen tried to find out what JB subscription offered to the respondents. Most of them (62.9%) said the periodical was for them a source of information not readily available in the Czechoslovakia of the normalisation period. Others mentioned that the JB subscription widened their overall cultural horizons (37.1%) and the specifications to this answer also mentioned well-funded music reviews. Some former members saw the periodical as a source of recordings (14.3%) or foreign language study opportunity (11.4%).

Question 18

VARIANT	FREQUENCY	%
yes	5	14.3
yes, to friends	23	65.7
yes, to my family	4	11.4
no	6	17.1

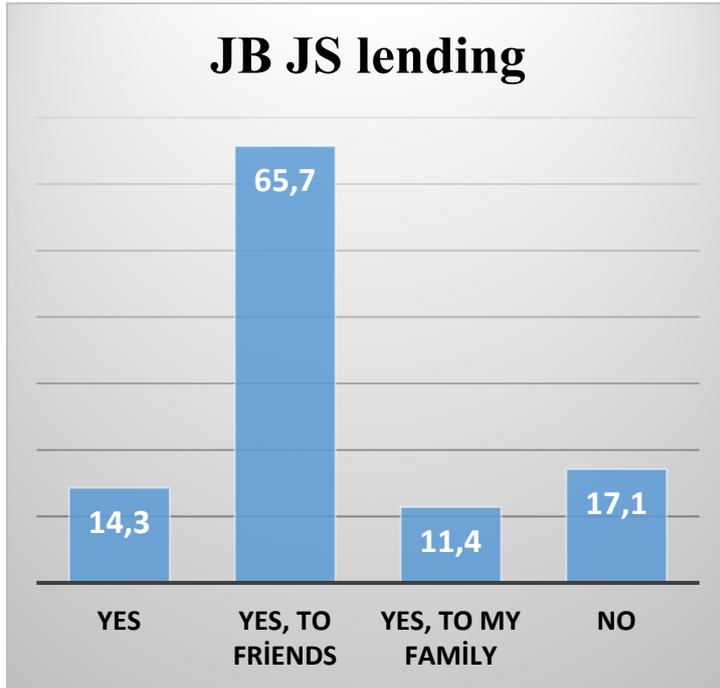


Figure 16, table 12: The subject of the eighteenth open question was to find out whether the respondents lent their copy of JB or not. Only 17.1% of the respondents said that they did not lend their copy of the periodical. The rest loaned the periodical, mostly to friends.

Question 19

VARIANT	FREQUENCY	%
yes, the JS	13	37.1
yes, other	7	20
no	16	45.7

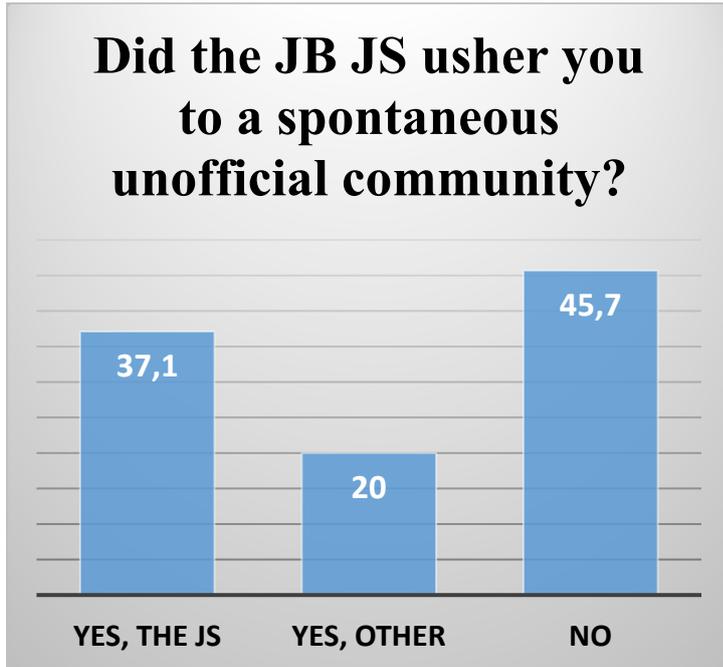
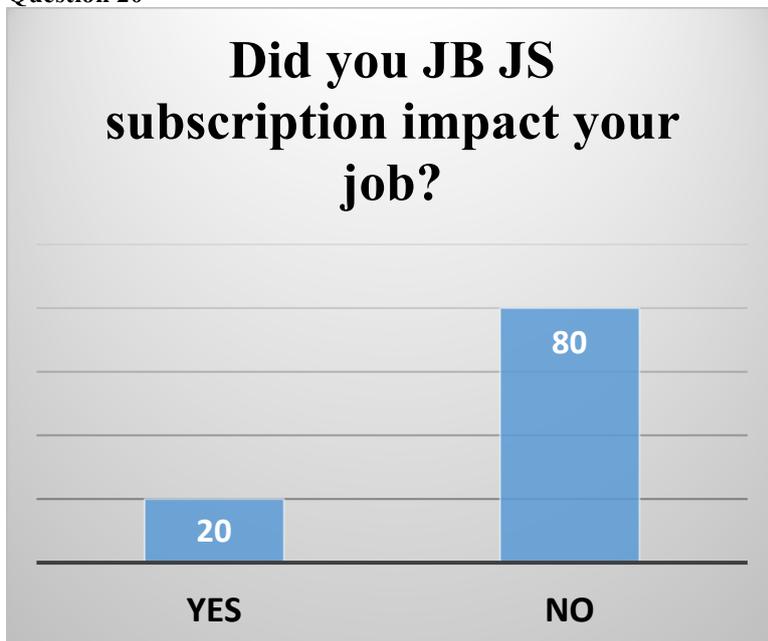


Figure 17, table 13: The nineteenth open question tried to grasp whether JB subscription brought the subscriber to a spontaneous unofficial community. Nearly half of the respondents (45.7%) did not join any community through the periodical subscription. 37.1% of them said that JB ushered them to the JS, and others (20%) mentioned Charter 77, music bands, jazz club memberships or the art scene.

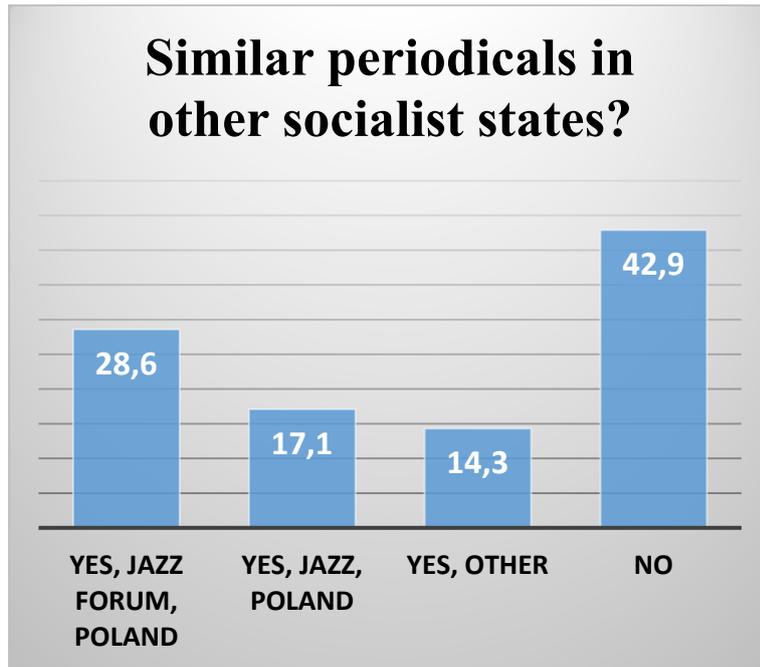
Question 20



VARIANT	FREQUENCY	%
yes	7	20
no	28	80
total	35	100

Figure 18, table 14: This open question mapped the impact of JS membership on the respondents' contemporary job. 80% of the respondents did not see any impact. The remaining 20% reported an impact of their JS activity on their job at the time of their membership in the form of threats, demotion, or even dismissal.

Question 21



VARIANT	FREQUENCY	%
yes, Jazz Forum, Poland	10	28.6
yes, Jazz, Poland	6	17.1
yes, other	5	14.3
no	15	42.9

Figure 19, table 15: The last but one (21st) open question tried to find out whether the respondents met with a periodical similar to JB JS in other socialist countries. 42.9% of the respondents did not come across any alternative to JB. The remaining respondents most often mentioned as an alternative to JB the journals Jazz Forum (28.6%) or Jazz (17.1%), issued in Poland.

Question 22

The final open question asked the respondents about their opinion of the JS heritage for the present. The answers to this question were extensive and could not be sensibly categorised.

The answers included:

- Cultural enlightenment despite the totalitarian regime.
- Longing for freedom, courage to stand against the authorities, openness in all directions.
- Use of critical common sense and free thinking.
- In a period of marasmus doing something for oneself and for one's surroundings always makes sense.
- A circle of friends for life and interest in a wide cultural spectrum.
- Doing things from the heart.
- An "Island of Freedom", created by the JS in the period of normalisation slush, did not come automatically and the values it promoted must be actively adhered to in order to prevent them from extinction.
- Music must not be a political instrument.
- The JS, as we know it, would never have come into existence in a liberal society.
- An excellent example of how a handful of enthusiasts managed to be free under very unfavourable conditions - that counts for a lot!

Results, Conclusions And Recommendations

The complex survey of the order of musical preferences of former JS members - JB subscribers, shown in detail in the above frequency tables and bar charts, reveals that out of the eight music categories five are in the same rank of preference as at the time of the JB subscription.

The purpose of this contribution was to introduce the Jazz Section of the Union of Czechoslovak Musicians and its periodical for members called Jazz Bulletin of Jazz Section and to outline the sociological profile of the JB subscribers in sociological categorisation.

The above mentioned results of the first research stage suggest that former members of Jazz Section of the union of Czechoslovak musicians - JB subscribers mostly have not changed their music preferences since the time of their JB subscription.

References

- Burke, V. (1984). *Aféra - myslí si oni - končí*. In: Západ
- Dědek, H. & Vlček, J. (2012). *Zub času: rozhovor*. Praha, Galén.
- Disman, M. (2014). *Jak se vyrábí sociologická znalost*. Praha, Karolinum.
- Dorůžka, L. (2002). *Český jazz mezi tanky a klíči 1968 - 1989*. Praha, Torst.
- Dorůžka, L. (1997). *Panoráma paměti*. Praha, Torst.
- Hendl, J. (2016). *Kvalitativní výzkum*. Praha, Portál.
- Kouřil, V. (2016) *Africké květiny*. Praha, 65. pole.
- Kouřil, V. (2006). *Divná hudba dob nekalých*. Praha, Volvox Globator.
- Kouřil, V. (1999). *Jazzová sekce v čase a nečase 1971 - 1987*. Olomouc, Torst.
- Matzner, A. & Poledňák, I. & I. Wasserberger. (1983). *Encyklopedie jazzua a moderní populární hudby I*. Praha, Supraphon.
- Novak, M. (1983). *Zpráva Jazzové sekce*. In: Západ
- Pelikán, J. (2011). *Základy empirického výzkumu pedagogických jevů*. Praha, Karolinum.
- Sedlecký, P. (1986). *Případ Jazzové sekce*. In: Svědectví.
- Srp, K. (1994). *Výjimečné stavy povolání jazzové sekce*. Praha, Pragma.
- Škvorecký, J. & Burke, V. (1992). *Vladimíra v Territorio libre: Spisy IV*. Praha, Společnost Josefa Škvoreckého.
- Švoncevá, V. (2013). *Činnost Jazzové sekce v letech 1969 - 1987 prizmatem bulletinu Jazz*. Univerzita Hradec Králové, Pedagogická fakulta.
- Tomek, O. (2003). *Akce Jazz*. In *Securitas imperii 10. Sborník k problematice vztahu čs. komunistického režimu k „vniřnímu nepříteli“*. Praha, Úřad pro dokumentaci a vyšetřování zločinu komunismu.

Soft Skills In The School Of Engineers In Morocco

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Abstract

What do our engineers really need? Are hard skills enough for a successful professional insertion of our students engineers? No, they need soft skills. »Soft skills « are behavioural competencies and collection of skills that determine how we interact with others in different environments and different situations. They are the personality traits and interpersonal skills required of engineers to succeed in almost any job. Soft skills are the ability to listen actively, to communicate effectively, to handle conflict positively. Soft skills impact job performance, and professional relationship. They play an important role in the workplace such as communication skills, problem solving skills, critical thinking, creativity, team building, time management and procrastination, solving, cultural awareness, self-esteem and self-confirmation. As teachers we reinforce the soft skills of our students to become successful managers in the future.

Keywords : *soft skills, hard skills, communication, critical thinking, professional behaviour, performance, management, workplace, positive thinking, successful student engineers.*

Introduction

Students unemployment has been the subject of many schools and universities over the last couple of years, and many of the teachers, supervisors and recruiters insist that the reason why young people are struggling to find suitable jobs after graduation is a lack of soft skills. Students care more about hard skills and neglect soft skills whereas Employees today are paying more and more attention to soft skills, and it's referred to as 21st century skills, but students still think about the word differently and underestimate the importance of soft skills. Soft skills not only empower the new graduated competencies in Communicative skills, Thinking and problem solving skills; Teamwork „dynamics but they also reinforce the Life-long learning, information management Entrepreneurship skills Ethics, professionalism. Leadership skills. When we think about soft skills and hard skills two kinds of questions come to our mind : »What you know « and » How you act « [1] » Soft skills are centrally important for human capital development and workforce success. A growing Skills, and abilities, and traits that pertain to personality, attitude, and behavior rather than to formal or technical knowledge” (Moss and Tilly 2001)

Literature Review

The most important soft skills that are the most needed by student are teamwork and collaboration, decision making, problem solving, time management, and critical thinking skills [2]” The undergraduate degree holder should master these skills. And yet, students should also be able to master new skills because they are players in the labour market (Chen 2016) [3]” Therefore, they should be endowed with meetings skills, negotiation skills and networking Skills” (Hawkins & Winter 1996) [4]” All these competencies should be in everyday life of a university student, in the light of what happens with a professional in an organisation, as recommended by (Chen 2016) .

[5]” According to Goleman (1997) there are many paths to success in life, and many areas where other skills are rewarded. Emotional intelligence provides advantages in a complex society. In fact, and according to this author, it is important to understand the other, both in terms of motivation and work habits [6] Job candidates with skills such as good communication; self-confidence and conscientiousness are more likely to have successful jobs search (Uysal & Pohmeir 2011) the sense of persistence and perseverance helps the students and job seekers to pursue their job search even if they encounter some difficulties. Their social and communication skills help them to have a large networking which allow them to be more informed and learn about job opportunities.

Candidates with good soft skills such as communication, self-marketing and social skills perform well during the interview and have more chance to be hired by the recruiters than the students with only good hard skills. [7] And the market field are looking for candidates with not only academic and/or technical skills such as literacy and numeracy but also soft skills (Burnett & Jyaram, 2012; Cunningham & Vllasenor 2014)

The Study

Soft skills are interpersonal and intrapersonal skills. Oral and written communication Teamwork and respecting work ethics and collaborators and being honest. The most important achievement of soft skills is self-motivation, dependability besides all these critical thinking, sense of leadership and problem solving by acquiring a great ability to work under pressure Creativity/innovation/resourceful Organizational/time management These skills define an individual's 'Emotional Quotient' (EQ) and 'Intelligence Quotient' (IQ). “[8]” According to André Iland, “this is

a ‘package’ of skills related to personality development that including social skills, communication and language skills, interpersonal habits, assertiveness, friendliness and optimism that demonstrate the relationship with the other”. “[9]” Stephen Covey, in his book *The 7th Habit*, describes a poll of 23,000 employees drawn from a number of companies and industries. He reports the poll's findings: • 37 percent said they have a clear understanding of what their organization is trying to achieve and why • One in five was enthusiastic about their team's and their organization's goals • One in five said they had a clear "line of sight" between their tasks and their team's and organization's goals • 15 percent felt that their organization fully enables them to execute key goals • 20 percent fully trusted the organization they work for.” - Chip Heath Infographic published by Neil Beyersdorf [linkedin.com/in/neilbeyersdorf](https://www.linkedin.com/in/neilbeyersdorf).

Hard skills and soft skills are equally important in preparing for college and career. Which one is more important if you want to be viewed as “successful”? Especially, if you want to grow (have more impact, more responsibility). How do I become a successful engineer?



“[10]” (www.agr.org.uk Horton W., Horton K.: www.horton.com)

How to become a better version of yourself. One of the most difficult things to teach and the most common reason for not hiring, not promoting, and also of poor performance is not accepting change.

2nd year students had to choose one of the 7th reinforced skills and nine weeks to work on the chosen skill . One of the most difficult things to teach

The working strategies (ENSIAS ‘Students) To develop one of these skills :

Students chose one of the four dimensions. Fix their objectives analyse the situation establish a schedule of (nine weeks to achieve their target)

Share their experience with experts in this fields and their classmates.

1-Good Communication Skills

2-Time management

3-Acting as a team player

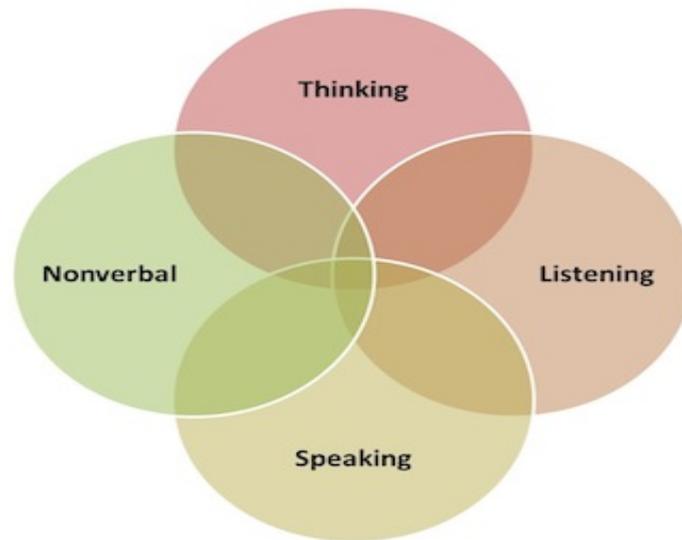
4- Flexibility/Adaptability

5-Self-Confidence

6- Positive Attitude

7- Good Personal Appearance and Common Sense.

1-Good Communication Skills How well one articulates what they speak or write. and understand the other person without having wrong perception .And also body language plays an important role ,every gesture has a meaning and also are you a good listener because active listener are successful people in their life.



2-Time management:To what extent you are able to manage your time properly without procrastination; here are some questions to ask one's self

- How well do I prioritize different tasks and projects at one time?
- Are you wise about the way you spend your time, use your time?

3- Acting as a team player: Personal reflection each student must ask himself how well does he work in group and if he has a specific preference and what is the importance of career 's choice and to what extent the student understand the value of diverse thought and cultural diversity.

4-Flexibility/Adaptability:To evaluate oneself and try to have open ideas, to be willing to be innovative and creative by adopting new situation and considering other alternatives. Once the person or student does this kind of self introspection the student accepts and embraces the change things that helps the individual to grow personally and professionally.

5-Self-Confidence:Many students suffer from lack of self-confidence, self-esteem and self-confirmation. The student tried to follow some strategies to gain this self-confidence. The first thing he has to believe in himself, trust his abilities, judgement and network. By doing so the students overcome some weaknesses as stage fright and stress and gain a kind of self-esteem and charisma.

6-Positive Attitude: *"Attitude is a little thing that makes a big difference."* – Winston Churchill. Negativity is a great monster that haunts people in general and students specially. Teacher tries to think positively, get rid of toxic ideas, spend energy in fruitful things by being optimistic and generate energy and communicate with people around.

7- Good Personal Appearance and Common Sense: To take care of one visual aspect taking care of personal cleanness and neatness of clothing. Having a good sense of judgment based on "experience" rather than on theory. Each student has to fix a specific objective and to bear in mind that the objectives are arrows that help the learner to reach the target and demonstrate his mastery of any procedure. The objective must be SMART; that is Specific, Measurable, Attainable, Realistic and Timely.

Findings

After nine weeks of personal introspection, self analysis and engagement the department of communication and language at ENSIAS (Ecole Nationale Supérieure d'Informatique et d'Analyses des Systèmes) has established two techniques of evaluation: a team evaluation and individual evaluation. » Out of 257 Students:

230 students were able to carry in the innovative process to change their behaviour, gain a new skill and presented their feedback.

12 students found difficulties to go through the process of change.

5 students were absent.

10 students were blocked and couldn't carry on to achieve their target did a great work by trying to develop one of the four human dimensions either mental, psychological, physical or emotional. They share their experience with their classmates.

The most common point among all the students is their resistance to change as they couldn't leave their zone of comfort; but after many negotiation with oneself they went through the process of change and they were able to do the grief hence they developed their soft skills. For instance students who had to develop one aspect of the physical dimension (biological aspect or behavioral aspect) they achieved their target and were satisfied by their realizations which impact their daily life and behavior.

So teachers and coaches have to supervise those students and coach them in order to overcome such weaknesses and to regain self-confidence, self-esteem and self-confirmation. After nine weeks the students make an oral presentation in front of their supervisors, experts in soft skills and their classmates.

Presenting the soft skill they wanted to improve, the strategies and the techniques they used and also the difficulties they encounter, the positive and negative points of this procedure.

And then they answered the two following questions

1-« Did I achieved my target? »

2-« What is the percentage of success of this procedure

This experience was successful at both levels personal level and professional level.

Personal level: it has a great impact on the life of our students. They went out of their zone of comfort. They accepted the change and celebrated their victory.

Professional level: Students developed a sense of responsibility and creativity. We got very satisfying feedback from recruiters; human resources and managers who had hired our students.

Conclusion

It's often said that hard skills will get you an interview but you need soft skills to get (and keep!) the job. We live in a society that measures intelligence (IQ) through quantifiable metrics. You complete the assignments, come to class, learn the concepts, and you get an "A". Emotional intelligence is your ability to recognize and understand emotions in yourself and others, and your ability to use this awareness to manage your behavior and relationships. In the workplace, most compliments will deal more with the use of *soft skills* (EI – Emotional Intelligence) than your hard skills. "It is not the strongest or most intelligent who will survive but those who can best manage change." – *Charles Darwin*.

This experience was conducted with 2nd year students of school of computer science engineers, it can be extended at the level of the faculties and schools of the university in Rabat (Morocco). The students' feedback was positive and they were satisfied with the change in their behavior and thinking. They become more open-minded and try to collaborate and help each other. Teachers and academicians must think of changing their pedagogical ways of teaching and search new ways that enhance soft skills without neglecting the hard skills. The self-awareness of oneself and improvement of the student's soft skills is a primordial task as it reflects a positive image of the student and it lets him identify his strengths and areas of improvement it reinforces his 3 K (Knowledge, Know-how, Know to be). It is also a good tool for teachers to detect students who are in difficulties and help them to overcome some personal difficulties and prepare to be self-confident and a good time management as this procedure awakes the student's sense of responsibility and engagement which he needs in everyday life and especially in the work place.

References

- [1] Philip Moss at University of Massachusetts Lowell. Philip Moss. 12.42; University of Massachusetts Lowell. Chris Tilly at University of California, Los Angeles..
- [2] Chen, P. Y. (2016). Teaching in offshore programmes: an assessment of university faculty's self-efficacy, cultural competence and preparedness. *Journal of Education for Teaching*, 42(2), 188-204.
- [3] Goleman D. (1997). *Inteligência Emocional*. Temas e Debates, Círculo de Leitores, Lisboa.
- [4] Chen, P. Y. (2016). Teaching in offshore programmes: an assessment of university faculty's self-efficacy, cultural competence and preparedness. *Journal of Education for Teaching*, 42(2), 188-204.
- [5] Hawkins, P., & Winter J. (1996). The self-reliant graduate and the SME. *Education + Training*, 38(4), 39
- [6] Burnett & Jayaram, 2012; Cunningham & Vllasenor 2014)
- [7] Burnett, N. & Jayaram, S. (2012). Skills for employability in Africa and Asia ISESE Skills Synthesis Paper: Innovative Secondary Education for Skills Enhancement (ISESE).
- [8] <https://www.amazon.com/Soft-Skills-Be-professionally-proactive/dp/1481895370>
- [9] Stephen Covey "The 7th Habits of successful people" - Chip Heath Infographic published by Neil Beyersdorf [linkedin.com/in/neilbeyersdorf](https://www.linkedin.com/in/neilbeyersdorf).

[10] Internet Resources British Association of Graduate Recruiters (AGR): www.agr.org.uk Horton W., Horton K.: www.horton.com

Iyer, Rukmini: <http://us.rediff.com/getahead/2005/jun/30soft.htm> Phani, Challa Ram:

<http://in.rediff.com/getahead/2007/jan/08soft.htm> PISA: www.pisa.oecd.org

Waggoner, Jaqueline: <http://mountainrise.wcu.edu/html/waggoner.pdf> Wikipedia: www.en.wikipedia.com

The Importance of Soft Skills: Education beyond academic knowledge

Bernd Schulz Polytechnic of Namibia NAWA Journal of Language and Communication, June 2008

Some Ethical Analyses For Vocational School Students: Accounting Department Sample*

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Abstract

Tenet state honest thinking as a mission that shots to practice goal to riposte count lower brands of ethical hitches. Ethical compartment is one of the core central behaviors of university undergraduates. Bootlegging is a factual non-ethical problem for some students' education life. It is an important research question that some ethical behaviors in conservatory life expectancy can be origin to new non-ethical behaviors in waged life expectancy after school (Nejati, M., Jamali, M. And Nejati, M., 2009). Also, added eloquent interrogations and life-threatening ponderings can help to tell the ethical hitches by questioning students' concepts about the question.

ethics arrangement with public anthropological capacity to ponder about ethical hitches that is not certain to thinking. The swift fluctuations in the high-tech life expectancy have begun various contests in the high-tech all god's creatures. In this marketable all god's creatures, in the family way the future peer group with goodness is a vizor commercial for public. These days all fledgling students are decidedly searching and have a supremacy of thought to their fathers at home-grown, their coaches in school and to their associate in societal life expectancy (Nejati, M., Jamali, M. And Nejati, M., 2009). In this homework, a reckonable feedback forms every day to a trial of 126 accounting branch students at a vocational school in turkey. Geometric scrutiny naked that feminine students have a pointedly a lowered amount of ethical actions in three aspects (egoism, hypothetical unprincipled and mainframe ethics) than masculine students. As an upshot, it can be alleged that they are cognizant of their household tasks in answering for the honest and ethical ideals.

Key words: *ethics, ethical behavior, vocational school student*

Introduction

The growing figure of ethical problems relating schools, professional and professionals has acknowledged inclusive devotion from the municipal and sequestered parts as well as education (Armstrong, 1993). Although educational resources suppose that the bed graphic of the ethics go downhearted pace by pace, non-ethical behaviors, such as unprincipled and bootlegging, are still effective (Kohlberg, 1993). Additionally, university students, upcoming teachers, engineers, employees and impending powerful humans in all area are estimated to realize turkey's goal in developed an ethical public group (Nejati, M., Jamali, M. And Nejati, M., 2009).

Moral awareness in the education program is a progression where a student has the capacity to diagnose and construe that a circumstance comprehends an honest topic. It requires the students to aware of identifying how one's action will harm to the other persons and could reason reason-act relations of the ethical condition in his/her social environment (Nejati, M., Jamali, M. And Nejati, M., 2009; Sahnkaran & Bui, 2003; Kılıçaslan at all, 2018; Şeneldir at all, 2017a). The student should recognize the presence of ethical problem mean which he/she could do properly and duck to non-ethical achievement. It is important point that the students are cognizant to ethical circumstances, it does not always signpost the conclusion of the verdict progression.

A student be familiar with a honest topic, accepting which achievement is honestly exact, open-minded, then begins the next progression of honest advance. In added confrontations, honest value states to one's capacity to choose a specific act in a proper environment. This approach involves students' cerebral advance by thoughtful of the resolve and fauna of societal cooperation during the education life (Görentaş And Yıldız, 1999; Bilgin at all, 2010; Yıldız And Görentaş; Bilgin And Görentaş, 2008). Somebody composes personal evaluation by age level and development with five or six phases. According to this approach, the steps are that from simple levels of support (minor point), students turn into searching and advance to added byzantine level of support relating lengthy-stretch, the social order webs and educational protagonist classifications termed points of honest cerebral (Nejati, M., Jamali, M. And Nejati, M., 2009; Koparan at all, 2018; of at all, 2017; Tola at all, 2017; O'leary, 2008). As well, non-ethical actions is not outward. The existence of non-ethical activities among students can be meticulous by their coach. A sentient bid of trainers to fashion ether that reassure ethical student actions is can be efficacious in the school milieu. In past donkey's years, alertness to societal values and its inclusive upshot on ethical ideals is upward. Societal values of realms can mark all happenings such as sportive and professional happenings. This take in ethical parts of this expanses. The insolence on the way to ethics may be unreliable from one realm to another unfluctuating if they are very adjacent separately added organically (Aydin at all, 2017c; Singhapakdi & Marta, 2005; Şeneldir at all, 2017b).

An establishment has abundant sponsor assemblages whose funding is crucial to bestowing to professional ethicists, (Nejati, M., Jamali, M. And Nejati, M., 2009; Aydin at all, 2017a; Aydin at all, 2017b; Lozano 2000). One central assemblage that ought to be a sponsor comprises of vocational school students, specifically professional branch students, who institute the imminent headship of the milieu. These assemblages have the professional and dogmatic privileged of next all god's creatures with a vast notch proceptivity. By a unpretentious, quick and vibrant announcement, card and Willingham (2009) state ethics as "on a social basis, how the all god's creatures is and how it ought to be". Popular this homework, we are wearisome to style vibrant and afford central evidence round the ethical observations of accounting branch students of a vocational school students.

* A brief version of this article presented at INTE 2018

Students’ ethical behavior depend on genders

Graham et al. (1994) in their study of unprincipled actions of a student group determined that professional students keep a tally pointedly minor on honest advance and honest cerebral gauges than the other study areas. According to another study of this team, they noted that most of all students (65.1%) conveyed which students have angry in high school, vocational school, and university life (Nejati, M., Jamali, M. And Nejati, M., 2009; Collins, 2000). Ferrer and Skinner (1988) stressed that when the much of commercial actors reflected to be non-ethical to transfer from net a non-paid music’s, more students on or after composition departments had the equivalent understanding than the professional students. Additionally, students ponder photocopying marketable program and taking composition data on or after the internet to be tolerable during the education life. The system of gender socialization has been searched by unlike examinations from unlike realms (Nonis & Swift, 2001). A study group proved that female participants were more connected with economic and commercial issues, when female participants were more concerned with social relations (Nejati, M., Jamali, M. And Nejati, M., 2009; Ruegger & King, 1992).

Method

There have be situated unlike bids for computing ethics mid count lower scholarships on all neck and neck of students’ ethics. Roughly edifying scientists have leisurely the brashness on the way to ethics via feedback form, a uncommon of them have sightsaw plaintiffs’ behavior of ethical conditions.

The trial for this homework emanates on or after one vocational school in turkey. The system castoff to accumulate figures for this broadside was passed purchasable in justification branch per 2 first class assemblages and 2 subsequent class groups 126 students be situated joined to the pursuit. This was abundant number to fix students’ inkling round ethical actions and modifications flanked by genders. Table 1 elasticities the gender cut of the homework trial. As shown 55% of the plaintiffs be situated men. In addition, plaintiffs’ time of life assortments from 18 to 25 years old.

Table 1 gender of study sample

Category	Frequency	Percent
Feminine	57	45.2
Female participant	69	54.8
Total	126	100.0

In this study we search for the undergraduates are pointedly “ruins” than feminine students, masculine students are pointedly lower way to “egoism” than feminine students, masculine students are pointedly lower way on the way to “unprincipled” than feminine students and finally, female participant students are meaningfully lower way to “computer ethics” than feminine students. For the aim of computing students’ ethical activities, a form was improved with the search of Zopiatis And Krambia-Kapardis (2008). The feedback form comprised of 19 interrogations, computing students’ ethical actions in the groupings, explicitly ruin of school regulations (4 questions), selfishness (6 questions), academic unprincipled (5 questions), and computer ethics (4 questions). Moreover, a fivefold measure advanced by Muncy And Vitell (1992) was added in the questionnaire, whether they are seeming these schedules as presence off beam (non-ethical), roundabout as 1, or not off beam (ethical), coded as 5 (Nejati, M., Jamali, M. And Nejati, M., 2009) .

Findings

We presented the discoveries in table 2. The grades illustration that masculine plaintiffs have a bigger callous in very four groupings of ruin of school protocols, egoism, academic unprincipled, and supercomputer ethics, import. It is clear that students lean toss to illustration a lowered amount of ethical actions for twofold genders.

Table 2 students’ ethical behavior.

Category	Gender	Mean	Standard deviation
Violation of school regulations	Feminine	1.784	0.351
	Female participant	1.654	0.257
Selfishness	Feminine	1.443	0.778
	Female participant	1.359	0.403
Academic cheating	Feminine	2.315	0.578
	Female participant	1.782	0.683
Computer ethics	Feminine	2.582	0.680
	Female participant	1.593	0.486

We can say that, according to above table, the female participant students have a pointedly lower way insolence on the way to ethics. In order to test the trustworthiness of the homework, we applied Cronbach's alpha in cooperation discretely and organized for all the aspects. The Cronbach's alpha for all the 19 items was 0.726. In order to test whether these modifications are substantial, we everyday t-trial. Even if both feminine and female participant plaintiffs get a mean value as lower than the mean value in the groups, the presentation of t-test shows that female participant respondents have a pointedly lower way actions on the way to all the groupings than feminine students (table 3). (Nejati, M., Jamali, M. And Nejati, M., 2009). Turkish female participant vocational school student's way to be lower values for non-ethical actions. Also, it can be said that generally female participants from all academic, social and economics level are more favorable then feminine. The number of Turkish female participant students who registered to elementary school, high school, vocational school and university is growing step by step.

Table 3. Test results levene's test for equality t-test for equality of means of variances.

		f	sig.	t	df	sig. (2-tailed)
Violations	Equal variances assumed	2.682	.125	2.459	124	.036
	Equal variances not assumed			2.352		.026
				135.117		
Selfishness	Equal variances assumed	10.185	.004	2.442	124	.042
	Equal variances not assumed			2.880		.005
				114.523		
Cheating	Equal variances assumed	2.751	.214	2.201	124	.037
	Equal variances not assumed			2.352		.050
				136.214		
Computer ethics	equal variances assumed	12.112	.000	3.205		.001
	Equal variances not assumed			124		.000
				3.420		
				116.400		

Results

Focusing on the findings, that is significant for vocational school to make students with ethical information, abilities and beliefs to respond with ethical impasses and level to do ethical resolution. Therefore, we recommend that vocational schools or other education society should promote the ethics values through training (Nejati, M., Jamali, M. And Nejati, M., 2009). It is same central to cognizant of that one of the prime penalty area of any edifying the social order is to advance students' in cooperation in my view and for money in the instruction life expectancy. It has two imports that first, if students with essential assistances and academic evidence, second, style them aware with the social order and professional ethical ideals for their ensuing life expectancy. This homework's discoveries are central because of its presence firs in this expanse directed in turkey.

References

Armstrong, M. B. (1993). Ethics And Professionalism In Accounting Education: A Sample Course. *Journal Of Accounting Education*, Vol. 11, No. 1, Pp. 77-92.

Aydın S., Of M., Kılıçaslan I., Akça Ü., Kahraman K., Mutlu C. (2017a). Analysing Of The Lecturer Practice At The Vocational School Mathematics. *Turkish Online Journal Of Educational Technology*, Si, 284-287.

Aydın S., Of M., Kılıçaslan I., Akça Ü., Kahraman K., Mutlu C. (2017b). Teaching Abstract Mathematics In Vocational Schools: Teachers' Views. *Turkish Online Journal Of Educational Technology*, Si, 15-19.

Aydın S., Genel Y., Kahraman K., Tola Y., Of M., Mutlu C. (2017c). On The Level Of Academic Achievement Of The Vocational School Students: The Effect Of Motivation. *Turkish Online Journal Of Educational Technology*, Si, 653-657.

Biglin, T. And Görentaş, N. (2008). A Note On Characterization Of $N_u(D_n)$. *International Electronic Journal Of Algebra*, 3, 135-140.

Biglin, T., Görentaş, N. And Kelebek, I.G. (2010). Characterization Of Torsion Units Of Z_{24} . *Journal Of Korean Mathematical Society*, 6, 1239-1252.

Collins, D. (2000). The Quest To Improve The Human Condition: The First 1500 Articles Published In The *Journal Of Business Ethics*. *Journal Of Business Ethics*, 26(1), 1-73.

Ferrell, O. C., & Skinner, S. J. (1988). Ethical Behavior And Bureaucratic Structure In Marketing Research Organizations. *Journal Of Business Ethics*, 25, 103-109.

Graham, M. A., Monday, J., O'brien, K., & Steffen, S. (1994). Cheating At Small Colleges: An Examination Of Student And Faculty Attitudes And Behaviors. *Journal Of College Student Development*, 35(4), 255-260.

Görentaş, N. And Yıldız, M. (1999). A Characterization Of Idempotents And Idempotent Generators Of Q_s . *Bulletin Of Pure And Applied Sciences*, 18(2), 289-292.

Kılıçaslan, I., Aydın, S., Türkeri, K. And Soydaş, H. (2018). Attitudes Tos Online Web Assisted Learning: Accounting And Tax Students. *The Online Learning Of Distance Education And E-Learning*, 6(2), 27-33.

Kohlberg, L. (1981). *Essays On Moral Development. The Philosophy Of Moral Development. Moral Stages And The Idea Of Justice*, New York, Usa.

- Koparan, B., Akça, Ü., Köş Aydın, F. And Aydın, S. (2018). On The Attitudes Of Construction Technology Students Tos Information And Communication Technology. *The Online Learning Of Distance Education And E-Learning*, 6(2), 67-73.
- Lozano, J. M. (2000). *Ethics And Organizations*. London: Kluwer Academic.
- O'leary, C. (2008). An Empirical Analysis Of The Positive Impact Of Ethics Teaching On Accounting Students. *Accounting Education*, Vol. 18, No. 4-5, Pp. 505-520.
- Muncy, J. A., & Vitell, S. J. (1992). Consumer Ethics: An Investigation Of The Ethical Beliefs Of The Final Consumer. *Journal Of Business Research*, 24(3), 297-312.
- Nejati, M., Jamali, M. And Nejati, M., (2009). Students' Ethical Behavior In Iran. *Journal Of Academic Ethics*, 4, Pp. 277-285.
- Nonis, S., & Swift, C. O. (2001). An Examination Of The Relationship Between Academic Dishonesty And Workplace Dishonesty: A Multicampus Investigation. *Journal Of Education For Business*, 69-76.
- Of M., Şeneldir O., Tola Y., Koparan B., Kahraman K. (2017). Scorm Nesneleri Ile Etkileşimli Eğitim. *Turkish Online Journal Of Educational Technology*, Si, 64-72
- Pass, S., & Willingham, W. (2009). Teaching Ethics To High School Students. *The Social Studies*, January/ February.
- Ruegger, D., & King, E. W. (1992). A Study Of The Effect Of Age And Gender Upon Student Business Ethics. *Journal Of Business Ethics*, 11, 179-186.
- Sankaran, T. & Bui, T. (2003). Relationship Between Student Characteristics And Ethics: Implications For Educators. *Journal Of Instructional Psychology*, Vol. 30, No. 3, Pp. 240-253.
- Singhapakdi, A., & Marta, J. K. M. (2005). Comparing Marketing Students With Practitioners On Some Key Variables Of Ethical Decisions. *Marketing Education Review*, 15(3), 13-25.
- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional And Social Intelligence Against Inertia. *Turkish Online Journal Of Educational Technology*, Si, Pp.229-234.
- Şeneldir, O., Kudu, M. Genel, Y., Akça, Ü., Soydaş, Aydın., S. (2017b). Types Of Behavior In Businesses And Resistance To Individual Change. *Turkish Online Journal Of Educational Technology*, Si, Pp.843-848.
- Tola Y., Aydın S., Şeneldir O., Mutlu C., Koparan B., Of M. (2017). Meslek Yüksekokulu Öğrencilerinin Memnuniyet Düzeyleri Üzerine Bir Araştırma. *Turkish Online Journal Of Educational Technology*, Si, 607-610.
- Yıldız, M. And Görentaş, M. (1996). On Homogenous Maps. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 1(2), 14-149.
- Zopiatis, A. A., & Krambia-Kapardis, M. (2008). Ethical Behavior Of Tertiary Education Students In Cyprus *Journal Of Business Ethics*, 81(3), 647-663.

South African Social Sciences Teachers' Understanding Of Democracy, Citizenship And Citizenship Education

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Abstract

This paper reports the findings of a study that surveyed a sample of social sciences teachers' understanding of the concepts of democracy, citizenship and citizenship education. A non-experimental survey research design involving quantitative data was used to generate data for the study. The results from the questionnaires were analyzed by means of descriptive statistical analyses. The three different definitions of each of the respondents were then coded by means of inductive and *a priori* coding. To reveal the meaning of the definitions, themes were identified, and organized into categories. The latter were used to summarize the content of the definitions.

The findings indicated that the most frequent elements to appear in the democracy definitions were forms of government and political equality (rights and responsibilities), and the least frequent element was the evaluative (critical thinking). The analyses of the respondents' citizenship definitions revealed that they held a minimalist view of South African citizenship. They saw citizenship as a responsibility and right. The elements with the lowest frequencies were membership, active and the evaluative. Two of the respondents made reference to critical multicultural citizenship. The respondents' citizenship education definitions gravitated towards the conservative orientation of citizenship education, and the emphasis was on responsibilities and education. The elements with the lowest frequencies were membership, evaluative, active and rights. A close reading of the three collected definitions revealed evidence of the reproduction of the existing socio-political order and the cultivation of national loyalty and obedience to authority. Given the latter, in practice, the education of critical, active and inquiring young South African citizens were not taking place.

Finally, an improvement plan to enhance democracy, citizenship and citizenship education within the framework of the school subject social sciences was recommended, given that the future of governments depends on citizenship education. "If the young is not trained by habit and reason in the spirit of the constitution, all is for nothing." (Thomas Jefferson)

Introduction

In 2018, South Africans celebrate 24 years of democracy. While the conditions of poverty, unemployment, disease and crime are daunting, their optimism about the prospects of democracy is encouraging. However, most citizens' involvement in governance is described as inadequate (Foley & Puta in Stevick & Levinson, 2007; TIMES Live, 2015). Foley and Puta's (in Stevick & Levinson, 2007) research findings confirm that a vibrant civil society is essential for democracy to flourish, and for them the solution to the problem lies in citizen participation and development. Globally, growing concern is also expressed in democracies about the "... levels of engagement or disengagement amongst young citizens and their ability to engage with basic civic responsibilities." (Hughes, Print & Sears, 2010, p.295; SAAPS, 2016). Hughes et al (2010) and Pinar (2011) confirm that one of the primary responsibilities of a public education system is to ensure that citizens have the knowledge and skills to effectively engage with the social, economic and political opportunities that are inherent to a democracy.

Problem Of The Study

Momentous curriculum changes have occurred in South Africa since the end of apartheid and the first democratic elections in 1994 (Department of Basic Education, 2011). A closer scrutiny of the curriculum policy documents revealed a number of problems, namely that the curriculum as document did not necessarily translate itself into curriculum as experience; and that it lacked conceptual clarity, coherence and consistency which resulted in conflicting forms and conceptions of citizenship and citizenship education. Citizenship education in South African public schools has in some cases a maximalist tone, but collectively reflects a minimalist conception of citizenship and citizenship education. South African public schools are providing the learners with knowledge about the country and the world's social, political, economic and geographical phenomena without any active engagement with social conflicts and problems such as racial and gender discrimination, conflicting political ideologies, competing economic systems, poverty and inequality. The emphasis in the values-based education documents is also on content instead of process, and the latter undermine democratic participation and an active citizenry, and promote obedience, if not, unquestioning loyalty to the South African government (Banks, 1990; Department of Basic Education, 2011; Mathebula, 2009).

According to Hammett and Staeheli (2009) and Parker (2015), the school subject social sciences globally focuses on democracy, human rights and citizenship education. However, the South African social sciences curriculum is abstract, and does not reflect the learners' experiences in their communities and society at large (Department of

Basic Education, 2011). Hughes et al (2010, 295) warned against curriculum policy documents depriving social sciences of its role of "... developing critical thinking and reflexivity among teachers and learners about the conflict-ridden realities of a world torn apart along political, economic, religious and racial lines." When school subjects do not focus on the conflicts and the problems of society, they serve the hegemonic power nexus, and reconfirm the social order. Mathebula (2009, pp. 2-3) cautions policy-makers that, "Democracy requires a range of forms of learning, both taught and caught, or inside and outside schools." For Hammett and Staeheli (2009), the minimalist conception of citizenship education is not appropriate for the South African context; what is needed is strategies for getting South Africa from where it is (mainstream conception of citizenship and citizenship education) to where the country ought to be (transformative conception of citizenship and citizenship education).

Research Question And The Purpose Of The Study

According to Kalous (as cited in Yazdgerdi, 1996, p.16), if practices of citizenship education are to change, it should start with a "... spontaneous bottom-up unfolding ..." of citizenship development reforms. With this in mind, the following exploratory research question was formulated: What could be done differently in terms of citizenship education in South Africa to enhance its potential for the development of informed, critical and participating citizens? Given this question, the purpose of the study was to survey a sample of social sciences teachers' understanding of democracy, citizenship and citizenship education to

- contribute to the current debate on the conceptual clarity, coherence and consistency in the education policies;
- sensitize role-players to strategies for getting South Africa from where it is to where the country ought to be; and
- serve as an impetus for further research to address the lack of citizen involvement in governance, and to promote a vibrant civil society in South Africa.

Literature Review

Given the topic of this paper, a brief description of the concepts democracy, citizenship and citizenship education is provided below. This is done to avoid any misunderstanding regarding the use of the concepts in this study.

Democracy

In the nation state, the modern concept of democracy consists of three principal components: democracy, constitutionalism, and liberalism. Each must exist in a political system to be a true democracy. The fundamental principles of democracy are the sovereignty of the people, political equality of all citizens, just powers of government based on the consent of the governed, and free, fair and frequent elections. Constitutionalism refers to the use of constitutions to limit governments by law, and to respect the freedom, equality and dignity of individual citizens. Liberalism recognizes the moral primacy of the individual and the protection of fundamental rights. Two parallel models of democracy are distinguished, the participatory (broad participation of the people in the direction and operation of political systems) and the representative (all eligible citizens vote for representatives to pass laws on their behalf) (Blaug & Schwarzmantel, 2006; Mathebula, 2009; McLaughlin, 1992).

Citizenship

The concept of citizenship has different meanings depending on the socio-cultural context and political organization of the state (Garcia, 2007). According to Mathebula (2009), South Africa is a participatory democracy and citizens' individual autonomy and equality are respected, and they need critical thinking skills for active engagement in all aspects of public life, both globally and nationally. According to Marshall (1950), citizenship is an equal status given to every citizen of a country, and they are granted rights and responsibilities. Marshall (1950) identified three kinds of rights: civil rights (freedom of speech, thought, faith and liberty); political rights (as elected member or voter); and social rights (public safety, health and education).

McLaughlin (1992) mapped citizenship along a continuum of minimalist and maximalist conceptions. He contrasted the minimalist and the maximalist conceptions of citizenship in terms of various citizenship issues. Major points of divergence between the two interpretations of citizenship are the extent of political involvement and the degree of critical understanding and questioning that is required for citizenship. With regard to a minimalist view, political involvement and participation is limited to voting for elected representatives, and citizenship is viewed as a private matter; while a maximalist view focuses on the broad participation of the people in government. The maximalist conception requires an explicit understanding of democratic principles, values and procedures, and the dispositions and capacities required for participation in the democratic processes. The minimalist conception requires an unreflective socialization of citizens into the political and social *status quo*.

Parker (1996) identified three conceptions of democratic citizenship, namely the traditional, progressive and advanced. According to him (Parker 1996), the traditionalists emphasize knowledge of government structures and

functions, and democratic values such as freedom of speech, liberty and voting. The progressives share a similar commitment, but also embrace notions such as strong democracy and civic participation in its numerous forms (Banks, 2004; Newmann, 1968). Advanced citizenship is built on the progressive perspective, but also focuses on the tensions between pluralism and assimilation (Parker, 1996). Additionally, Parker (1996) identified three conceptions of good citizenship, the personally-responsible, participatory and justice-oriented. A personally-responsible citizen has a good character, is a responsible member of the community, and endeavors to solve problems. A participatory citizen is knowledgeable about the operation of government agencies to resolve social problems, and want to improve society through civic participation, good relationships, common understandings, trust and collective commitments. A justice-oriented citizen, critically assesses social, political and economic structures to identify injustices, solve social problems and improve society.

Citizenship education

Citizenship education, in many countries, is categorized along a continuum of minimal to maximal characteristics. Minimal citizenship education includes normative ideas of citizenship, such as a legal ascription of citizens' identity and their rights and duties, with an emphasis on equality for all, without accounting for the diversity within multicultural societies. Within this form of citizenship education, the goal is to educate good citizens who are law-abiding, contribute to society, and possess good characters. The pedagogy is content-led with the focus on civic knowledge, with little or no attention to participation in processes to address societal structures and relations that create inequalities among citizens (Maree et al, 2012; McLaughlin, 1992).

Kerr, Stuurman, Schultz and Burge (2010) and McLaughlin (1992) describe maximal citizenship education as the development of learners' values, attitudes and skills for participation in democratic processes and civic organizations. The goal is to foster young citizens' involvement in political, societal and civic structures. The pedagogy focuses on the school curriculum and extra-curricular activities such as participation in school governance and service learning. The emphasis is on the acquisition of knowledge and skills in a variety of subjects.

Extending McLaughlin's (1992) minimal and maximal approaches to citizenship education, DeJaeghere (2006) and DeJaeghere and Tudball (2007) put forward the critical citizenship education approach that problematizes and (re)constructs democratic citizenship to address civic realities such as exclusion and discrimination, and the factors that prevent the full enactment of democratic citizenship in multicultural societies. This approach shares foundational principles with critical pedagogy, and the recent developments in multicultural education and post-colonial theory. Kincheloe and Steinberg (2002) explain that a critical multicultural approach to citizenship education questions the existing socio-political order that creates injustices and inequalities for certain groups in society. Both knowledge and participation are used to empower learners to understand and engage with the underlying causes of social problems in society. Knowledge in this approach refers to a critical analysis of historical and contemporary developments and practices of citizenship in nation-states, and the social structures through which democracy are enacted. This knowledge is learned from a variety of disciplinary and cultural perspectives, including perspectives of marginalized knowledge. Learners should develop positive attitudes and emotional connections to those who are different from themselves, and also engage with contested issues.

From the above, it is clear that the purpose of citizenship education is the development of good citizens. In terms of its implementation, which includes policies, curriculum and teaching strategies, the purpose is expressed as either conservative (maintaining the *status quo*), or progressive (empowering individuals and groups to struggle for emancipatory change). Citizenship education practices are situated somewhere along a continuum between these two orientations, but gravitate towards one or the other. The conservative orientation privileges reproductions of the existing socio-economic order to instill national loyalty, obedience to authority, voluntary service, and the assimilation of immigrants. It also deals with national narratives, historical and geographical facts, the functioning of government institutions, the reproduction of social structures, and the development of moral character and social cohesion. Representative democracy and voting are the most important expression of citizenship participation. The progressive orientation privileges societal transformation (gender, race and class), social justice, diversity, and emancipation by identifying and reducing the tension between capitalism and democracy. The most important expression of progressive citizenship is participation and activism. It nurtures critical analysis, political engagement, and cross-cultural respect and understanding to develop active, informed and critical citizens (Shugurensky & Myers, 2003).

Research Methodology

Critical theory was used as theoretical framework of the study given its emphasis on reason as the highest potential of human beings, and that by reasoning it is possible to criticize and challenge the nature of existing societies. It also claims that bias is present in every human action, that research can address the bias, injustice and subjugation

that shape people's experiences and understanding of the world, and that a study of the latter can result in an understanding, critique and change of society (Blaikie, 2001).

The context of the empirical study was a rural secondary school in the Gauteng province. The school has 1200 learners and 36 teachers. It has four grade 7 classes, nine grade 8 classes, and thirteen grade 9 classes with Tswana as language of teaching and learning. Access to the school was via an old tar road and a dirt track. Electricity, running water and poor sanitation facilities were available. The school buildings were overcrowded and needed renovation. The qualifications of the staff ranged from matriculation (Grade 12) certificates to honor's degrees, and their teaching experience varied from none to between 21 and 30 years.

A non-experimental survey research design involving quantitative data was used to generate data for the study of the rural teachers' knowledge and understanding of what it means to be a South African citizen. As a result of practical decisions to access an existing group, the non-probability convenience sampling technique was used. As the researcher was interested in getting an inexpensive and quick approximation of the truth regarding the development of rural South African citizens, only a limited number of respondents were involved (Maree et al, 2012). Stoker's (1985) guidelines for sampling were used to determine the sample size of the study. The questionnaire was group-administered to a sample of 15 teachers that included sub-groups of gender, age, academic qualifications, teaching experience, and grades and subjects responsible for. The objective of the questionnaire was to obtain facts and opinions about a phenomenon (citizenship development) from respondents who were informed about the particular issue (conceptions of democracy, citizenship and citizenship education).

The questionnaire started with a few biographical questions followed by three structured questions. The following biographical questions were included: a closed dichotomous question to determine the teachers' gender, and three fill-in questions to identify their ages, qualifications, experience, teaching subjects, and the grade(s) that they are teaching. A scaled question was formulated to determine the extent of their academic knowledge and understanding of the concepts democracy, citizenship and citizenship education. The questionnaire was concluded with three fill-in questions to determine the teachers' authentic knowledge and understanding of the concepts. The following ethical principles were negotiated with the respondents prior to the start of the data-collection procedure, namely anonymity, voluntary participation and confidentiality.

Results And Discussion

After the data has been captured, the descriptive statistical analyses were done using Microsoft Excel. The results from the questionnaires are presented in Tables 1 to 8.

Biographical information

Table 1 (see below) contains the frequency distribution of the gender of the teachers. Of the 15 teachers who responded to the question, 9 (64.29%) were female and 5 (35.71%) male. One (7.14%) of the sampled teachers did not respond to the question.

Table 1: Teachers by gender

Gender			
Female		Male	
Frequency (f)	Percentage (%)	Frequency (f)	Percentage (%)
9	64,29	5	35,71
Total	*14		

* One of the 15 teachers did not respond to the question.

Table 2: Age distribution of teachers

Years	Frequency (f)	Percentage (%)
20-24	1	6.7
25-29	2	13.3
30-34	-	-
35-39	1	6.7

40-44	3	20.0
45-49	2	13.3
50-54	3	20.0
55-59	3	20.0
Total	15	100

Table 2 (above) reflects the age distribution of the teachers. Of the 15 teachers, one (6.7%) were between 20 and 24 years of age, two (13.3%) between 25 and 29, and another one (6.7%) between 35 and 39. Three of the sampled teachers (20.0%) were between 40 and 44 years, and two (13.3%) between 45 and 49 years of age. Six of the teachers were within the age cohorts of 50 and 54 (3, 20.0%) and 55 and 59 (3, 20%) respectively.

Knowledge and understanding of the key concepts

The teachers' opinion on the extent of their knowledge and understanding of the concepts democracy, citizenship and citizenship education are presented in Table 3 below.

Table 3: Extent of teachers' conceptual knowledge and understanding

Teachers' conceptual knowledge and understanding		
Category	Frequency (f)	Percentage (%)
Excellent	5	33.3
Good	7	46.7
Average	2	13.3
Poor	1	6.7
Total	15	100

Of the 15 sampled teachers, 5 (33.3%) indicated that their conceptualization of the three concepts was excellent, seven (46.7%) that it was good, two (13.3%) that it was average, and one (6.7%) that it was poor.

Qualitative data from the three definitions

The three different definitions of each of the respondents were coded by means of inductive and *a priori* coding. Each definition was read to elicit elements that might or might not be evident in the other definitions. The elements elicited from the document study were also used to bring order, meaning and structure to the collected information. The process of reading the data in this manner continued until an exhaustive list of possible elements was created. In each of the definitions, themes that would facilitate the teachers' understanding of the concepts were identified, and organized into coherent categories to summarize and reveal the meaning of the definitions. The categories used to classify the elements were: form (type of government, status); rights (civil, political, social, status); responsibilities (participation, status); membership (belonging to, status); evaluative (critical thinking); active (agency, practice, attitude); and knowledge (education) (Garcia, 2007; Mathebula, 2009; Schoeman, 2006). The results are reported in Tables 4 to 6 that focus on each of the three definitions.

Table 4 (below) contains the frequency distribution of the key elements in the teachers' democracy definitions.

Table 4: Frequency of elements in the teachers' democracy definitions

Element	Frequency (f)	Percentage (%)
Form	7	46.7
Rights	3	20.0
Responsibilities	3	20.0
Evaluative	2	13.3
Total responses	15	100

Of the teachers (n=15) who were sampled, the most frequent element to appear in their democracy definitions was form, with 7 (46.7%) references to forms of government. The second most frequent elements were rights (n=3, 20.0%) and responsibilities (n=3, 20.0%), and the least frequent element was the evaluative as only two (13.3, %) of the teachers referred to this element. The analysis of the teachers' democracy definitions revealed that the majority of them included references to forms of government. Most of the respondents referred to the fact that South Africa was a representative democracy, "... by voting to elect representatives to a parliament" (Teacher #7), and that "... all eligible members of [the] state vote through elected representation ... so that they represent them well." (Teacher #6). In only a few of the definitions, references were made to participatory democracy: "...

Government of the people" (Teacher #9), and a "... . System of government by the whole people" (Teacher #5). The definitions of the teachers provided evidence that they were knowledgeable about their status as citizens of a democratic South Africa, and multiple references to political equality (rights and responsibilities) were included. For example, Teacher #4 referred to the: "Right to vote ... and ... responsibility to ... say ... how and who should ..., make decisions for the people."

A low percentage of the teachers (2, 13.3%) made reference to the evaluative element. Despite the implementation of an education system conducive to the establishment of a democratic South Africa with participatory democracy and active citizenship at its core, in practice, the education of active, critical and inquiring individuals were not taking place. The latter are vital skills for citizens to affect the decisions that political representatives take on their behalf (Blaug & Schwartzmantel, 2006). According to Banks (1990), citizenship education in a democracy has to empower students to take control of their own lives, and for this they have to ask critical questions. Two of the teachers included references to some of the other characteristics of a democracy such as critical multicultural citizenship. For example, the protection of fundamental rights and dignity was cited: "I have rights to basic needs as stated in [the] South African Bill of Rights. ... The people have human rights" (Teacher #8), and that in a democracy the citizens are "Free from oppression, discrimination, and segregation to be governed according to ... [the] constitution of my country." (Teacher #10)

Table 5 below contains the frequency distribution of the key elements in the teachers' citizenship definitions.

Table 5: Frequency of elements in the teachers' definitions of citizenship

Element	Frequency (%)	% of responses
Responsibilities	6	40.0
Rights	4	26.7
Membership	2	13.3
Active	2	13.3
Evaluative	1	6.7
Total responses	15	100

Of the teachers who were sampled, the most frequent element included in their citizenship definitions was responsibilities. From the 15 responses, 40% (n=6) of the teachers' definitions contained this element. The next frequently mentioned element was rights (26.7%, n=4), followed by membership (13.3%, n=2) and active (13.3%, n=2). The least frequent element was the evaluative (6.7%, n=1). The results of the analysis of the citizenship definitions revealed that the respondents held a minimalist view of citizenship. They obeyed the calls for law and order and good neighborliness, but were more concerned about their formal and legal status, than their public duties and participation through representative politics.

A close scrutiny of the above responses, revealed the teachers' views on citizenship as a status (rights, membership) and an attitude (agency, active, evaluative). One of the most salient elements in the citizenship definitions of the respondents were their references to responsibilities and political rights: "I have a rights to vote for a government that represent me. I need ... access to information To make the right choices." (Teacher #10), and "I ... have the right to vote and choose the party that will be able to represent us as the voters" (Teacher #2). Two of the respondents referred to social and civil rights: "I have rights to housing, citizenship, ... and safe and clean water" (Teacher #7), and "I legally belongs to South Africa and have the rights and protection of my country." (Teacher #8). According to Pena (2003), democratic societies cannot be found on rights and institutions alone, they also depend on the qualities (responsibilities, participation, accountability) of their members. Habermas (1996, p.72) observed that "... the citizen as individual can reflectively use these qualities and attitudes to change their situation, position or material legal status." In the teachers' citizenship definitions, references were also made to citizenship as an attitude. Teacher #6 wrote: "I should be loyal to my country Carrying out my duties to the best [of my] ability. ... [and] choose who I want to run the country. (someone who is a hard worker, honest and trustworthy)."; and Teacher #15 explained that citizens have to "... respect other peoples' right[s] [that is] whether you are a disabled person or not ... I would like to be [a] paramedic women so that I can help people who are injured in an accident." The element with the lowest frequencies in the respondents' citizenship definitions was once again the evaluative. McLaughlin (1992) indicated that the extent of citizens' political involvement is related to the degree of their critical understanding and questioning. Political involvement in South Africa is limited to voting. It was clear from the respondents' citizenship definitions that only a few of them developed the critical faculties to understand and question the issues related to equity and justice at local and societal levels such as to: "... help people who are poor and ensure that they get a healthy life style." (Teacher #15), "... I will fix the lights on [the]

street and make sure that the roads are save and ... fine." (Teacher#2), and "I ... will Take part in community activities (volunteering)." (Teacher #13).

Table 6 below provides the frequency distribution of the key elements as identified in the citizenship education definitions of the teachers.

Table 6: Frequency of elements in the teachers' citizenship education definitions

Element	Frequency (%)	Responses (%)
Responsibilities	6	40.0
Education	3	20.0
Membership	2	13.3
Evaluative	2	13.3
Active	1	6.7
Rights	1	6.7
Total responses	15	100

Of the teachers (n=15) who were sampled, the most frequent elements to appear in their citizenship education definitions were responsibilities and education. Of the responses, 40% (n=6) and 20.0% (n=3) of the definitions contained these two elements. The next most frequent elements were membership (13.3%, n=2) and evaluative (13.3%, n=2), and the two least frequent elements were active and rights, with 1 teacher (6.7%) each. The respondents' citizenship education definitions gravitated towards the conservative orientation of citizenship education. According to Inman and Buck (1995), citizenship education should be concerned with empowerment and the development of learners' ability to take control, and exercise responsibility over their own lives, and to ask critical questions, evaluate evidence and question the taken-for-granted. A close reading of the collected citizenship education definitions revealed that all of them contained evidence of the reproduction of the existing socio-economic order, including the cultivating of national loyalty and obedience to authority. The emphasis was on the minimalist conception of citizenship education with the functioning of government institutions, representative democracy, and voting as the most important experiences of citizenship participation: "... to provide the young people with an understand[ing] of the political [,] legal, and ... respect [for] the citizen." (Teacher #9), and "... citizenship education Means they want people leaving education with an understanding of the political ideal and economic functions of adult society and with the social and moral awareness to thrive in it." (Teacher #7). Teacher #12 wrote, "Citizenship education [is to] promote responsibility and taking pride and to be [a] patriot." Teachers #13 and #14 respectively demonstrated that it is taught: "to ... ensure that we get a good education in our own country so that we can help our community to develop educationally and support of our government."; and to "... involve all people to address common issues and learn to solve them." In terms of Greeno's (1991) environmental view of knowing, in the South African citizenship education classrooms, the learners learn about an environment without exploring the actual territory.

Conclusion And Recommendations

Given Parker's (1996) identified conceptions of democratic and good citizenship, this study revealed that the sampled teachers demonstrated that they held traditional and progressive conceptions of democratic citizenship. According to him (Parker, 1996), as traditionalists they emphasized knowledge of government structures and functions, and democratic values such as freedom of speech, liberty and voting. However, as progressives they embraced notions such as strong democracy and civic participation in its numerous forms (addressing common and welfare issues by volunteering) (Banks, 1990; Newmann, 1968). Only two of the teachers, demonstrated characteristics of advanced citizenship, as they focused on the tensions between pluralism and assimilation (Charles Taylor cited in Parker, 1996).

Parker (1996) also identified three conceptions of good citizenship, the personally-responsible, participatory, and justice-oriented. The social sciences teachers sampled for this study, identified with the characteristics of personally-responsible citizens as they saw themselves as having good characters and being responsible members of the community with as their core responsibility the solving of problems. They also indicated that they were participatory citizens who were knowledgeable about how the South African government agencies operate to resolve social problems, and to improve society through civic participation, good relationships, common understanding, trust and collective commitments.

The social sciences teachers involved in this study, revealed a conservative orientation to citizenship education. They viewed the purpose of citizenship education as the reproduction of the existing socio-economic system, and to instill in prospective citizens national loyalty, obedience to authority, and voluntary services. The social sciences

curriculum focused mainly on national narratives, historical and geographical facts, the functioning of government institutions, the reproduction of social structures, and the development of moral character and social cohesion as the most important expressions of citizenship participation.

This paper is concluded with a response to the research question that was posed at the beginning of the study, namely: What could be done differently in terms of citizenship education in South Africa to enhance its potential for the development of informed, critical and participating citizens? Widespread consensus of how to respond to the issue of citizenship education exists across the democratic world (Hughes, Print & Sears, 2010). Given the above, the following are recommended for the South African context:

- A thorough conceptual analysis of the curriculum policy documents. Pinto (2012) asserts that curriculum policy documents are highly political since they set out what learners "ought to learn" and what teachers "ought to teach". Apple (2004) advises that curriculum theorists, teacher educators and teachers should document the conceptual tools which are used in curriculum policy documents to reveal to what extent they may act as agents of hegemony, and perform latent ideological functions.
- Democratic citizenship education as primary focus of social sciences education. Roth and Desautels (2004) and White (2000) demonstrated that there exists a close link between social sciences and citizenship education as both focus on discovery learning, active learner engagement and social participation. According to Parker (1996) and Ross (2006), Thomas Jefferson pointed out that the people are democracy's engine, and that they must be educated for political engagement. The critical social sciences education (CSSE) approach is the most appropriate approach to citizenship education. It is grounded in the maximalist conception of citizenship and citizenship education using both the informal and formal curricula. This approach is part of the progressive citizenship education orientation, and empowers learners to critically examine and engage with social reality; and create a more democratic and socially just world. Active teaching and learning strategies are used to develop learners' higher order thinking skills to interrogate issues such as racism, gender inequality, multiculturalism, and social criticism (Kumar, 2012; McLaughlin, 1992; Ross, 2006; Shugurensky & Myers, 2003).
- Building curriculum for citizenship education. Hughes et al (2010) and Zevin (2015) conducted analyses of leading democracies, and identified factors associated with the building of effective citizenship education curricula. These were used to propose an action plan for the design of an effective citizenship education curriculum for the South African context. See Table 7 below.

Table 7: Designing an effective citizenship education curriculum for South African schools

Six elements	Actions
Debate	Initiation of a national debate on the issue as change agent towards a proactive curriculum.
Goals	Formulation of widely accepted goals to establish standards for citizenship education as part of social sciences education.
Curriculum materials	Development of pedagogically sound teaching and learning support materials.
Funding	Adequate government funding for effective implementation.
Teacher development	Provision of substantive pre- and in-service teacher education programs.
Research	Funding of research and development to support citizenship education policy, program development, and pedagogy.

This paper is concluded with Aristotle's argument that the future of a regime depends on citizenship education, and if the young is not trained by habit and reason in the spirit of the constitution, all is for nothing. Given the above, politics are a central concern of education, the nature and extent of citizenship education is the major determinant of politics, and governments can do much to provide effective citizenship education to its citizens (Department of Basic Education, 2011; Jones & Jones, 1992; Watson, 2005).

References

- Apple, M.W. (2004). *Ideology and curriculum*. Third edition, New York: Routledge Falmer.
- Banks, J.A. (1990). Citizenship Education for a pluralistic democratic society. *The Social Studies*, 81(5), 210-214.
- Banks, J.A. (2004). Teaching for social justice, diversity and citizenship in a Global world. *The Educational Forum*, 68, 296-305.

- Blaikie, N. (2001). *Social research: Approaches to social enquiry*. London: Polity Press.
- Blaug, R. & Swarzmantel, J. (2006). *DEMOCRACY A READER*. (pp. 1-20). Edinburg: Edinburg University Press
- DeJaeghere, J.G. (2006). Intercultural meaning and global citizenship in the Australian secondary curriculum. Between critical contestations and minimal constructs. In D. Stevick and B.A. Levinson (Eds.), *Reimagining civic education. How diverse societies educate for democratic citizenship*. (pp. 293-305). Lanham, MD: Rowman and Littlefield.
- DeJaeghere, J.C. & Tudball, L. (2007). Citizenship. Looking Back, Looking Forward. *Critical Citizenship. Teaching and Learning* 3(2), December, 40-57.
- Department of Basic Education. (2011). *Curriculum Assessment Policy Statement. Social Sciences. Senior Phase, Grades 7 to 9*. Pretoria: Government Publishing Company.
- Foley, D. & Puta, M. (2007). Developing citizen leaders for democratic governance in South Africa. In E.D. Stevick, and A.U. Levinson (Ed.), *Reimagining Civic Education: How Diverse societies form democratic citizens*. (pp. 28-38). Plymouth: Rowman & Littlefield.
- Garcia, E.G. (2007). *On the concept and models of citizenship*. Granada: University of Granada.
- Greeno, J.G. (1991). Number sense as situated knowing in a conceptual domain. *Journal of Research in Mathematics Education*, 22, 170-218.
- Habermas, J. (1996). *Between Facts and Norms: Contributions to a Discourse theory of Law and Democracy*. Translated by Willaim Rehg. Michigan, MA: MIT Press.
- Hammett, D. & Staeheli, L.A. (2009). *Citizenship in South Africa: A report to schools*. Cape Town: University of Cape Town Centre for African Studies.
- Hughes, A.S., Print, M., & Sears, A. (2010). Curriculum capacity and citizenship education: a comparative analysis of four democracies. *Compare*, 40(3), 293-309.
- Inman, S. & Buck, M. (Eds.), (1995). *Adding value? School's Responsibility for Pupils' Personal Development*. Stoke-on-Trent: Trentham Books.
- Jones, E.B. & Jones, N. (1992). *Education for Citizenship, Ideas and Perspectives for Cross-curricular Study*. London: Kogan Page.
- Kalous, J. (1996). Civic Education Reform in the Context of Transition. In T. Yazdgerdi (Ed.), *Changes in the Educational System*. (pp. 14-18) Prague: Report on Eastern Europe.
- Kerr, D., Stuurman, I., Schultz, W., and Burge, B. (2010). *ICCS. 2009. European Report. Civic knowledge, attitudes and engagement among lower-secondary students in 24 European countries*. Amsterdam: Multicopy.
- Kincheloe, J.L. & Steinberg, S.R. (2002). *Changing multiculturalism*. Buckingham: Open University Press.
- Kumar, A. 2012. Transition: Effect of a Paradigm shift in Curriculum Discourse. *Transnational Curriculum Inquiry* (1) from [http:// nitinat.library. ubc. Ca./ojs/index.php/tci](http://nitinat.library.ubc.ca/ojs/index.php/tci). 8 June 2016.
- Maree, K., (Ed.), J.W. Creswell, L. Ebersohn, I. Eloff, R. Ferreira, N.V. Ivankova, J.D. Jansen, J. Niewenhuis, J., Pietersen, V.L. Plano Clark, & C. Van der Westhuizen. (2012). *First Steps in Research*. Pretoria: Van Schaik.
- Marshall, T.H. (1950). *Citizenship and social class: and other essays*. London: Cambridge University Press.
- Mathebula, P.T. (2009). *Citizenship education in South Africa: A critique of post-apartheid citizenship education policy*. PhD thesis. Department of Philosophy. Johannesburg: University of the Witwatersrand.

- McLaughlin, T. (1992). Citizenship, Diversity and Education: A Philosophical Perspective. *Journal of Moral Education*, 21(3), 235-250.
- Newmann, F.N. (1968). Discussion: Political Socialization in schools. *Harvard Educational Review*, 38, 536-545.
- Parker, W.C. (1996). *Social Studies Today. Research and Practice*. Second Edition. New York and London: Routledge.
- Parker, W.C. (2015). *Social Studies*. New York: Continuum Press.
- Pena, J. (2003). The Citizenship. In A Arteta (Ed.), *Political theory: power, morality, democracy*. (pp. 10-15). Madrid: Alianza.
- Pinar, W. (2011). *Curriculum Studies in South Africa: Intellectual histories, past, present circumstances*. New York: Palgrave Macmillan.
- Pinto, L.F. (2012). *Curriculum Reform in Ontario*. Boston, MA: Pearson.
- Ross, E.W. (2006). The struggle for the social studies curriculum. In E.W. Ross (Ed.), *The Social Studies Curriculum: Purpose, Problems, Possibilities*. (pp. 50-60). Albany, NY: State University of New York.
- Roth, W.M. & Desautels, J. (2004). Educating for citizenship: reappraising the role of science education. *Canadian Journal of Science, Mathematics and Technology*, 4(2), 149-168.
- SAAPS (South African Association for Political Studies). 2016. *Decolonization after Democracy: Rethinking Politics into the 21st Century*. Annual Conference held at the University of the Western Cape in Bellville, Cape Town. 21 August to 2 September.
- Schoeman, S. (2006). A blueprint for democratic citizenship education in South African public schools: African teachers' perceptions of good citizenship. *South African Journal of Education*, 26(1), 129-142.
- Shugurensky, C. & Myers, J.P. (2003). Citizenship education: Theory, research and practice. *Encounters on Education*, 4, Fall, 1-10.
- Stoker, D.J. (1985). *Sampling. Personal communication to the author*. Pretoria: Human Science Research Council.
- TIMES LIVE. 2015. *South Africa at risk but there is "still reason to be optimistic*. Available: <http://www.timeslive.co.za?local/2015/08/12/SA-at-risk-but-there-is-still-reason-to-be-optimistic>. Accessed 15 May 2018.
- Watson, B.C.S. (2005). *Civic education and culture*. Wilmington, Del: ISL Books.
- White, C. (2000). *Issues in Social Studies: Voices from the classroom*. Springfield: Charles C Thomas.
- Zevin, J. (2015). *Social Studies for the Twenty-first Century. Methods and Materials for Teaching in Middle and Secondary Schools*. New York and London: Routledge.

Sport Emotional Questionnaire: A Study On Validity And Reliability

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Abstract

Individuals experience a series of different emotions during sport activities (Hanin, 2000; Lazarus, 2000). Sport researchers, who are studying on the relations of emotions and performance and the distribution of the emotions, need valid and reliable scales. In this context, the objective of this study is to adapt the Sport Emotional Questionnaire, which includes items based on the emotional experiences of the athletes and which is a pre-competition emotion scale, to Turkish culture. Totally 191 athletes (87 females, 104 males) volunteered to participate in the study (MeanAge= 23,76 + 4,05). Sport experience of the participants was calculated as Meanexperience= 8,73 + 3,82. Sport Emotional Questionnaire, which was developed by Jones et al.(2005), was used as the data collection tool in the study. Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) were used in order to examine the factor structure of the scale. Additionally, Cronbach Alpha (α) coefficient was used concerning the reliability of the scale. When the findings of the study are examined, the original form of the sport emotional questionnaire, which was originally five-item, was transformed into a four-item structure after the adaptation process to Turkish Culture. Moreover, since the four items were gathered under different sub-dimensions, they were excluded from the model and re-analyzed. After the last analyses concerning the validity of the scale, goodness of fit parameters were calculated as $\chi^2/df:2.370$, CFI: .95, SRMR: .003, RMSA: .08. As the conclusion, it was concluded that, having been developed for the athletes and adapted to Turkish Culture, the Turkish form of Sport Emotional Questionnaire was valid and reliable.

Keywords: *Sport Emotion, validity, reliability, Athlete.*

Introduction

Although the definitive description of emotion varies according to researchers, Fredrickson (2001) defines emotion as a cognitively assessed response given consciously or unconsciously to a fact. This response “triggers a stream of reaction flows that manifests itself in a system of superficial assembled components such as subjective experience, facial expressions, cognitive functioning and physical changes” (s.218). Some researchers emphasize the behavioral aspect (i.e., behavior tendencies) of the emotional reaction (see in Gross, 1998; Russell,2003).

This article focuses on how an inventory, which can be useful to assess the subjective feeling associated with an emotion, can be developed. Studies suggest that the context of the emotional experience can confidently be defined only with two dimensions including intensity and pleasure (Parrot, 2001). Physical and behavioral features accord with emotions in the most optimistic approach as long as the individuals who experience these situations do not verify by conveying their insights.

Emotion in the emotion scales in sports studies is used as affectivity and mood changes. However, there are theoretical differences between these structures (for a discussion on this topic, see Ekman & Davidson, 1994). Mood explains the long-term situations which an individual being in without knowing the reason for experienced feelings (Parkinson, Totterdell, Briner, & Reynolds, 1996). Conversely, emotions are relatively short-term and triggered by a particular premise (Lane & Terry, 2000). Affectivity is a broad term used to explain everything about emotions such as choices, feelings, and moods (Rosenberg, 1998). The Sports Emotional Questionnaire, which was developed to emotions by considering these definitional differences, is related to the individual's responses against a specific event (i.e., what do you feel about this competition) rather than what the individual generally feels (i.e., what do you feel now?). With the view that if the answer that is given in the question "what are you feeling now" is used when asked before the competition, emotional responses given to other situational factors will have been evaluated as well as those related to the competition (i.e.,the anger related to the delay in traffic on the way to the competition), if we use the question “what do you feel about this competition”, it is thought that the collected measurement will be related to emotional responses associated with the competition, and the Sport Emotional Questionnaire has been developed (Jones et al., 2005). There is neither a sport-specific perspective nor a developed or adapted measuring instrument for competition or sporting performance in our country. In this context, this study aims to adapt sport emotional scale to Turkish culture.

Method

Research Group

The validity and internal consistency reliability were tested on the athletes competing in different league status in different provinces in Turkey during the 2017 – 2018 season and the athletes were recruited according to purposeful sampling. 191 athletes ($Mean_{age}=23,76 \pm 4,05$) including 87 females (45,5%) and 104 males (54,5%) participated in the study. The means score of the sports experience was found to be $Mean_{experience}=8,73 \pm 3,82$.

Table 1: The distribution of the participants according to gender variable

	N	%
Women	87	45,5
Men	104	54,5
Total	191	100,0

When table 1, is examined, it seen that 191 athletes ($Mean_{age}=23,76 \pm 4,05$) including females 45,5% (87) and 54,5% males (104) participated in the study.

Data Collection Tools

Personal Information Form

The form designed by the researchers included information such as gender, age, sports branch, and sports experience (How long have you been competing?).

Sport Emotional Questionnaire (SEQ)

Sport Emotion Questionnaire developed by Jones et al. (2005) to measure the emotional state of the athletes. With the view that if the answer that is given in the question "what are you feeling now" is used when asked before the competition, emotional responses given to other situational factors will have been evaluated as well as those related to the competition (i.e., the anger related to the delay in traffic on the way to the competition), if we use the question "what do you feel about this competition", it is thought that the collected measurement will be related to emotional responses associated with the competition, and the Sport Emotional Questionnaire has been developed (Jones et al., 2005). The original questionnaire has 5 sub-dimensions including 22 items.

Data Collection/Process

Before starting to the translation process, the permission was asked via e-mail, and the authors granted the permission. Standard translation and back translation method suggested by Brislin (1986) was used in the translation process. In this method, there should be two independent translators. The first translator translated the original scale into the target language; the second translator did the back translation (Carlson, 2000). According to Savaşır (1994), the translators should know both language and the related concept about the scale. In this context, the original scale was translated into Turkish and then the Turkish form was translated into the original language by using the translation-back translation method. The English version of the scale was translated by one expert in the English language and two experts who know English in sports sciences. Translated scale items were compared with each other. The same experts made the necessary corrections regarding meaning and grammar by discussing on the Turkish version. The items having the same and the different translations were translated into English again by different language experts. Back-translation version of the scale was compared to the original scale, and differences and mistakes were determined. English translation was compared to the original scale, the last version of Turkish scale was created with the closest translations. The last version of the scale was applied to the athletes before or after training to find out the construct validity and reliability.

Analysis

In data analysis, Confirmatory factor analysis (CFA) was applied to test whether the scale was verified in Turkish culture. In the first analysis, because 5-factor structure was not confirmed, Exploratory Factor Analysis was conducted, and it was found that the scale had a 4-factor structure in Turkish culture.

In confirmatory factor analysis, maximum likelihood method was used to analyze the data. In confirmatory factor analysis, to confirm that the scale had an acceptable fit (χ^2/df ratio, root mean square error of approximation-RMSEA, standardized root mean square residual-SRMR, Tucker-Lewis Index-TLI, Comparative Fit Index-CFI and Goodness of Fit Index-GFI), the indices were evaluated by considering some criteria. Thus, χ^2/df ratio under 3 indicates perfect fit (Kline, 2005; Sümer, 2000). It is stated that RMSEA and SRMR value of 0-0.05 is a good fit, 0.05-0.10 is acceptable fit; the CFI value of 0.97-1.00 is a good fit, 0.95-0.97 is acceptable fit; GFI value of 0.95-1.00 is a good fit, 0.90-0.95 is acceptable fit (Schermelleh-Engel, Moosbrugger and Müller, 2003). Moreover, divergent and convergent validity analyzes of the scale were conducted in "Master Validity Tool" created by Gaskin & Lim (2016) in AMOS 21 program. The validity analysis was conducted in AMOS 21; the reliability was tested in SPSS 20 by using Cronbach's alpha values and Pearson Products Moment Correlation coefficient.

Table 2: Exploratory Factor Analysis

4 Factor Model

	1	2	3	4
d20	,859			
d10	,856			
d15	,828			
d19	,819			
d13	,808			
d5	,776			
d3	,766			
d17		,842		
d2		,832		
d12		,797		
d22		,764		
d7		,712		
d9			,855	
d14			,839	
d18			,736	
d16				,844
d21				,769
d6				,751
Açıklanan Varyans		% 6,680		
Açıklanan Toplam Varyans		% 74,208		

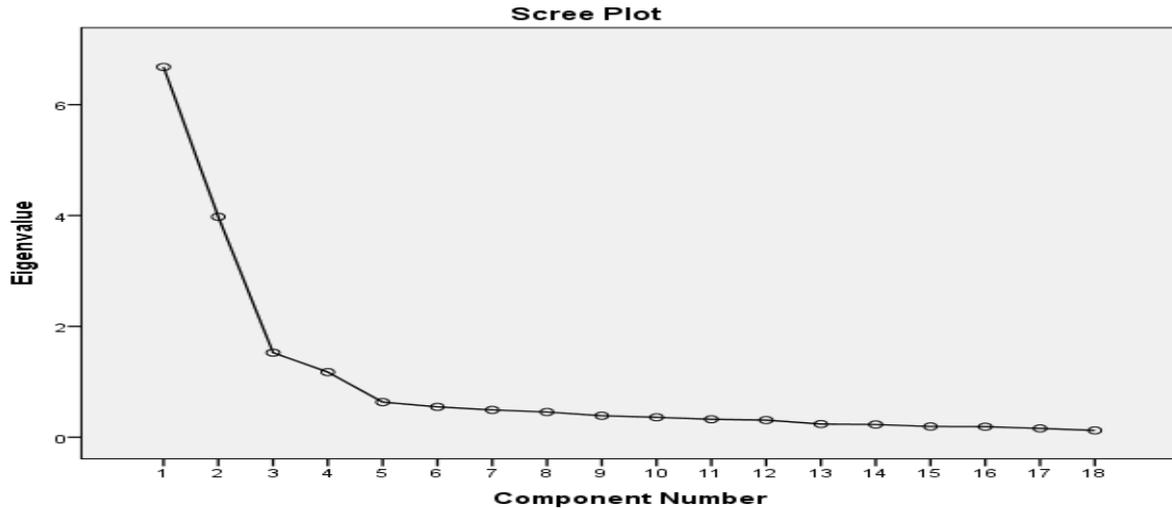
In the evidence collection process associated with scale construct validity, EFA, which is a statistical method that aims at explaining the structure with a smaller number of variables by gathering variables (items) measuring the same structure, was used (DeVellis, 2014; Tezbaşaran, 2008). It can be explained by the Kaiser-Meyer-Olkin (KMO) coefficient and Bartlett test whether the data collected from the study group is proper for factor analysis (Büyüköztürk, 2014). In this case, it is expected that the Bartlett test should be significant and KMO value should be higher than 0.50. According to literature, the KMO value is accepted as 0.60 medium, 0.70 good, 0.80 very good, 0.90 excellent. KMO value of 0.60 and significant Bartlett test indicate that the data is proper for factor analysis (Tavşancıl, 2014; Çokluk et al., 2012), reveal that the data comes from multivariate normal distribution and that the factoring technique between variables can be used (De Vellis, 2014; Fraenkel and Wallen, 2000; Kline, 1994). In this study, KMO sample fit value was 0.92, and the Bartlett test of Sphericity chi-square value was 2012.543 ($p < 0.01$). These values indicated that the data collected from the study group perfectly proper for the factor analysis.

There are various factoring techniques such as principal component analysis, maximum likelihood factor analysis, unweighted least squares analysis, and weighted least squares analysis (Tabachnick and Fidell, 2007). However, suggesting that principal component analysis is more powerful than many factoring techniques regarding psychometric aspect, mathematically simple and effective to cope with potential factor uncertainty problems, Stevens (1996) has said that principal component analysis is a technique that should be preferred with priority because of its listed advantages (cited in Akbulut, 2010). Hence, "Principal Component Analysis" was used in this study.

In Principal Component Analysis, the contribution of each factor to total variance and the latent variables having Eugene value over 1 by Kaiser-Guttman principle were considered when deciding factor number (Kline, 1994; Murphy and Davidshofer, 1991; Zwick and Velicer, 1986). Furthermore, the rotation technique was used to interpret factor structure easily and to gather items highly correlated with each other in a factor. Tabachnick and Fidell (2007) suggest that the direct oblimin rotation technique can be preferred in the axis rotation used in the conditions that the scale factors are correlated.

In this study, because the sub-dimensions of the features aimed to be measured were predicted to be correlated, the direct oblimin rotation technique was applied. According to many researchers (DeVellis, 2016; Büyüköztürk et al., 2012; Tavşancıl, 2014), the item factor loading value in a factor should be over 0.30. However, some researchers (Ferguson and Takane, 1989) suggested that 0.40 should be the cutoff point for the factor pattern. Accordingly, the cutoff point for item factor loading was accepted as 0.40. In the removal process of the items not measuring the same structure, it was considered that the factor loading should be over 0.40 and the difference between loading values should be 0.10 to prevent overlapping when an item had a high factor loading for two different factors (Büyüköztürk, 2014).

Figure 1: The Scree Plot



In figure 1, when the scree plot supporting to all decisions is examined, after the fourth point the slope makes a plateau. Besides, as it is seen in figure 1, the Eugene value of each factor is over 1.

Table 3: The fit indices of four- and five-factor measurement models

	χ^2	df	χ^2/df	CFI	SRMR	RMSEA	GFI
5 Factor	478.312	127	3.28	.82	.09	.09	.87
4 Factor	301.019	127	2.37	.95	0.03	08	.96

In table 3, when the fit indices are examined, while the indices for 5-factor structure are $\chi^2=478.312$, $df= 127$, $\chi^2/df= 3.28$, $GFI= .87$, $CFI=0.82$, $SRMR=0.09$ and $RMSEA=0.09$, those for 4-factor structure are $\chi^2=301.019$, $sd= 127$, $\chi^2/df= 2.37$, $GFI= .96$, $CFI=0.95$, $SRMR=0.03$ and $RMSEA=0.08$. As the result of maximum likelihood analysis, all of the items in the scale had high t values.

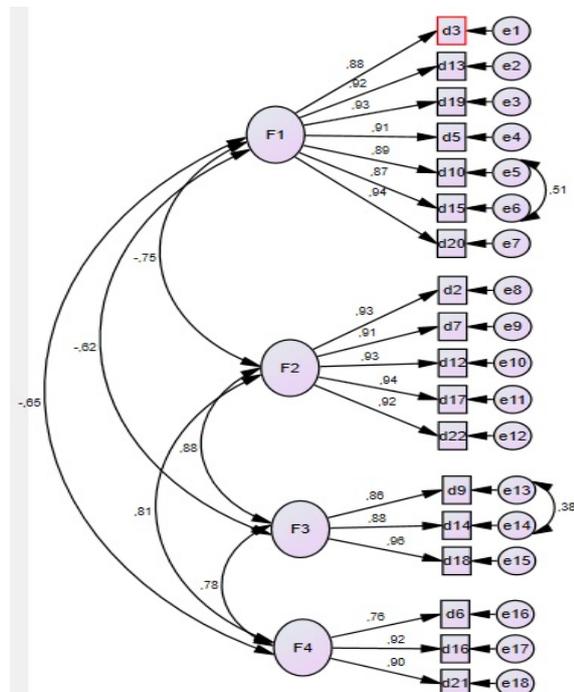


Figure 2: Diagram for the four-factor measurement model

In the result of CFA, the factor loadings of the 4-factor model are displayed in figure 1. Figure 1 shows that the item loading values between latent and observed variables are between 0.87 and 0.94 in enthusiasm and happiness;

0.91 and 0.94 in indisposition; 0.86 and 0.96 in anger, 0.76 and 0.92 in anxiety. Kline (2010) suggested that the standardized weights of around 0.30 were moderate, while weights of .50 and above reflected large effect sizes. Hence, it can be said that item factor loadings collected as the results of CFA reflect large effect sizes. The values collected from CFA can be interpreted that the Sport Emotional Questionnaire can perform the valid and reliable measurement.

Convergent and Divergent Validity

Table 4: CR, AVE, MSV and factor-factor correlations

	CR	AVE	MSV	MaxR(H)	F1	F2	F3	F4
F1	0,970	0,823	0,567	0,972	0,907			
F2	0,966	0,852	0,773	0,972	-0,753***	0,923		
F3	0,928	0,811	0,773	0,947	-0,624***	0,879***	0,900	
F4	0,896	0,743	0,651	0,917	-0,648***	0,807***	0,777***	0,862

When table 3 is examined, Cr values range between .89 and .97. Besides, AVE value ranges between .74 and .85. When the factor-factor correlation is examined, it can be said that the significant correlation levels are moderate and high.

Reliability

Table 5: Cronbach’s alpha and item correlation in Enthusiasm and happiness dimension

	Scale Deleted	Mean if Deleted	ItemScale Deleted	Variance if Deleted	ItemCorrected Correlation	Item-Total Cronbach's Alpha if Deleted
d3	15,618		62,153		,868	,969
d13	15,377		61,699		,896	,967
d19	15,393		61,103		,902	,966
d5	15,560		62,606		,896	,967
d10	15,712		61,006		,901	,966
d15	15,670		61,275		,881	,968
d20	15,487		60,377		,922	,965

Cronbach’s alpha value of Enthusiasm and happiness dimension was found to be 0.97. When the Cronbach’s alpha coefficient values calculated after deleting each item, the reliability coefficient decreased after deleting items. Item total correlation coefficients in Enthusiasm and happiness sub-dimension was 0.92 at highest (d20. Item) and 0.87 (d3. Item) at lowest.

Table 6: Cronbach’s alpha and item correlation in dejection dimension

	Scale Deleted	Mean if Deleted	ItemScale Deleted	Variance if Deleted	ItemCorrected Correlation	Item-Total Cronbach's Alpha if Deleted
d2	4,335		29,403		,908	,957
d7	4,492		29,072		,887	,961
d12	4,545		29,334		,906	,958
d17	4,466		29,092		,914	,956
d22	4,382		29,153		,900	,958

Cronbach’s alpha value of dejection dimension was found to be 0.97. When the Cronbach’s alpha coefficient values calculated after deleting each item, the reliability coefficient decreased after deleting items. Item total correlation coefficients in Enthusiasm and happiness sub-dimension was 0.91 at highest (d17. Item) and 0.89 (d7. Item) at lowest.

Table 7: Cronbach’s alpha and item correlation in anger dimension

	Scale Deleted	Mean if Deleted	ItemScale Deleted	Variance if Deleted	ItemCorrected Correlation	Item-Total Cronbach's Alpha if Deleted
d9	2,738		8,036		,870	,916
d14	2,623		8,057		,887	,902
d18	2,859		8,406		,867	,918

Cronbach’s alpha value of anger dimension was found to be 0.94. When the Cronbach’s alpha coefficient values calculated after deleting each item, the reliability coefficient decreased after deleting items. Item total correlation coefficients in Enthusiasm and happiness sub-dimension was 0.89 at highest (d14. Item) and 0.87 (d18. Item) at lowest.

Table 8: Cronbach's alpha and item correlation in anxiety dimension

	Scale Mean if Deleted	ItemScale Variance if Deleted	ItemCorrected Correlation	Item-TotalCronbach's Alpha if Deleted
d6	3,236	7,276	,716	,906
d16	3,586	6,707	,846	,794
d21	3,534	6,776	,804	,831

Cronbach's alpha value of anxiety dimension was found to be 0.90. When the Cronbach's alpha coefficient values calculated after deleting each item, the reliability coefficient decreased after deleting items. Item total correlation coefficients in Enthusiasm and happiness sub-dimension was 0.85 at highest (d16. Item) and 0.72 (d6. Item) at lowest.

Discussion And Conclusion

This study was conducted to provide some relevant evidence for validity and reliability of Sport Emotion Questionnaire developed by Jones et al. (2005). In line with the study purpose, it was seen that internal consistency reliability coefficient of subdimensions of Sport Emotion Questionnaire ranged between 0.90 and 0.97. The internal consistency reliability coefficients were between 0.80 and 1.00, which Alpar (2001) suggested as highly reliable. In the study conducted by Jones et al. (2005), the internal consistency coefficients of the questionnaire having 22 items including 5 factors were found to be between 0.81 and 0.87. As it is stated by DeVellis (2016), the internal consistency coefficients are enough between 0.65 and .80.

The Turkish form of Sport Emotion Questionnaire, which was created the final version in line with translation-back translation method and experts' opinions, was applied to the athletes. In data analysis to test the construct validity, principal component analysis and confirmatory factor analysis were used. The results of the principal component analysis revealed four factors for Sport Emotion Questionnaire. Four-factor structure that was found out as the result of principal component factor analysis explained 74.208% of the total variance of "Sport Emotion Questionnaire." Factor loading ranged between 0.71 and 0.86. It was found out that there were 7 items in enthusiasm and happiness (factor 1), 5 items for indisposition (factor 2), 3 items for anger (factor 3), and 3 items for anxiety (factor 4). In this context, it was stated by Alpar (2001) that having factor loadings over .45 was acceptable.

Moreover, Erefe (2002) and Özgüven (1999) stated that item factor loadings could be accepted up to .30. Accordingly, the values can be said to meet the criteria. It can be said that the items in the questionnaire are acceptable. In confirmatory factor analysis, to confirm that the scale had an acceptable fit, χ^2/df ratio, RMSEA, SRMR, CFI, GFI, and TLI were evaluated. Some references are indicating the statistical model fit was used. In many types of research, more than one fit index is referenced. In this study, frequently used indices such as the ratio obtained by dividing chi-square by degrees of freedom (χ^2/df), root mean square error of approximation (RMSEA), standardized root mean square residual (SRMR), Tucker-Lewis Index (TLI), Comparative Fit Index-CFI and Goodness of Fit Index (GFI) were used. To have a good fit for a model, RMSEA should be smaller than 0.06. However, it is acceptable to have values up to .08 (Hu & Bentler, 1998). Having the value obtained by dividing chi-square by degrees of freedom under two indicates perfect fit (Tabachnick and Fidell, 2007). Conversely, there are studies suggesting that the value under 3 indicate perfect fit (Kline, 2005; Sümer, 2000).

Moreover, GFI and CFI should be over 0.90 for an acceptable fit, having values between 0.95 and 1.00 indicates perfect model fit (Bentler, 1990; Hu & Bentler, 1999). When all these criteria were considered, it was found that the hypothesized model of Sport Emotion Questionnaire had an acceptable fit and the indices were enough for model fit. Thus, the model consisting of eighteen items and four factors was found to be statistically fit.

Convergent validity refers to the statement related variables are correlated with each other and factor they constituted. Divergent validity is that the statements related to variables should be less correlated with the other factors. For the convergent validity, CR values should be higher than AVE values, and AVE should be higher than 0.5 (Hu & Bentler, 1999). In line with our results, having lower AVE values related to the questionnaire than CR values indicates that the scale has convergent validity.

For the divergent validity, it was examined whether MSV values were lower than AVE values. It is suggested that having lower MSV values than AVE values is evidence for divergent validity (Hu & Bentler, 1999). In this direction, it is seen that MSV values are lower than AVE values. In another word, the scale has divergent validity.

Consequently, in line with the result obtained from the validity and reliability studies of the Turkish form of Sport Emotion Questionnaire, it can be said that the questionnaire can be used validly and reliably to measure the athletes' emotional state before the competition. Some limitation of this study should be considered. For instance, construct validity related to validity and reliability, convergent and divergent validities and internal consistency coefficients were examined in this study. Additional studies are needed for psychometric features of the questionnaire. Furthermore, examining Sport Emotion Questionnaire in different groups will be beneficial. Conducting the criterion-related validity of Sport Emotion Questionnaire, examining its relationship between different concepts, and testing the factor structure for males and females will contribute to the validity and reliability of the questionnaire.

Author Note

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References

- Akbulut, Y. (2010). Sosyal Bilimlerde SPSS Uygulamaları. İstanbul: İdeal Kültür Yayıncılık
- Alpar R. (2001). Spor Bilimlerinde Uygulamalı İstatistik. Nobel Yayın Dağıtım, Ankara.
- Brislin RW. (1986). The wording and translation of research instruments. In W. J. Lonner & J. W. Berry (Eds.), Field methods in cross-cultural research (CrossCultural Research and Methodology Series, Vol. 8, pp. 137-164). Beverly Hills, CA: Sage.
- Büyüköztürk, Ş. (2014). Sosyal Bilimler İçin Veri Analizi El Kitabı: İstatistik, Araştırma Deseni SPSS Uygulamaları ve Yorum (Genişletilmiş 20. Baskı), Ankara: Pegem Akademi.
- Büyüköztürk, Ş., Kılıç-Çakmak, E., Akgün, Ö. E., Karadeniz, Ş. ve Demirel, F. (2012). Bilimsel araştırma yöntemleri (Geliştirilmiş 11.Baskı), Ankara: Pegem Yayınları
- Carlson ED. (2000). A Case Study in Translation Methodology Using the health- promotion lifestyle profile. II. Public Health Nursing. 17(1), 61-70.
- DeVellis, R. F. (2016). Scale development: Theory and applications (Vol. 26). Sage publications.
- Ekman, P., & Davidson, R.J. (1994). The nature of emotion. Oxford, England: Oxford University Press.
- Erefe İ. (2002). Veri toplama araçlarının niteliği. İ Erefe (ed), Hemşirelikte Araştırma, İstanbul: Odak Ofset, s.169-188.
- Ferguson, F. & Takane, Y. (1989). Statistical Analysis in Psychology and Education, McGraw Hill Book Company.
- Fredrickson, B.L. (2001). The role of positive emotions in positive psychology: The broaden- and-build theory of positive emotions. American Psychologist, 56, 218-226.
- Gaskin, J. & Lim, J. (2016), "Master Validity Tool", AMOS Plugin. Gaskination's StatWiki.
- Gross, J.J. (1998). The emerging field of emotion regulation: An integrative review. Review of General Psychology, 2, 271-299.
- Hanin, Y.L. (2000). Successful and poor performance emotions. In Y.L. Hanin (Ed.), Emotions in sport (pp. 157-187). Champaign, IL: Human Kinetics.
- Hu, L. T., & Bentler, P. M. (1998). Fit indices in covariance structure modeling: Sensitivity to underparameterized model misspecification. Psychological methods, 3(4), 424.
- Hu, L., Bentler, P.M. (1999), "Cutoff Criteria for Fit Indexes in Covariance Structure Analysis: Conventional Criteria Versus New Alternatives" SEM vol. 6(1), pp. 1-55.
- Jones, M. V., Lane, A. M., Bray, S. R., Uphill, M., & Catlin, J. (2005). Development and validation of the Sport Emotion Questionnaire. Journal of Sport and Exercise Psychology, 27(4), 407-431.
- Kline RB. (2005). Principles and practice of structural equation modeling (2. ed.). NY: The Guilford Press.
- Kline, P. (1994). An Easy Guide To Factor Analysis, Routledge, London.
- Kline, R.B. (2010). Principles and practice of structural equation modeling (3rd ed.). New York: Guilford Press.
- Lane, A.M., & Terry, P.C. (2000). The nature of mood: Development of a conceptual model with a focus on depression. Journal of Applied Sport Psychology, 12, 16-33.
- Lazarus, R.S. (2000). How emotions influence performance in competitive sports. The Sport Psychologist, 14, 229-252.
- Parkinson, B., Totterdell, P., Briner, R.B., & Reynolds, S. (1996). Changing moods: The psychology of mood and mood regulation. London: Longman.
- Parrott, G. (2001). Emotions in social psychology. East Sussex, England: Psychology Press
- Rosenberg, E.L. (1998). Levels of analysis and organization of affect. Review of General Psychology, 2, 247-270.
- Russell, J.A. (2003). Core affect and the psychological construction of emotion. Psychological Review, 110, 145-172.

- Savaşır I. (1994). Ölçek uyarlamasındaki sorunlar ve bazı çözüm yolları. *Türk Psikolojisi Dergisi: Özel Sayı, Psikolojik Testler*, 9(33): 27-32.
- Schermelleh-Engel K, Moosbrugger H, Müller H. (2003). Evaluating the fit of structural equation models: Test of significance and descriptive goodness-of-fit measures. *Methods of Psychological Research-Online*, 8(2), 23-74. 35.
- Stevens, J. (1996). *Applied multivariate statistics for social sciences. (Third Edition)*. NJ: Lawrence Erlbaum Publishers.
- Sümer N. (2000). Yapısal eşitlik modelleri: Temel kavramlar ve örnek uygulamalar. *Türk Psikoloji Yazıları*, 3(6), 49-74.
- Tabachnick BG, Fidell LS. (2007). *Using multivariate statistics (5th ed.)*. Upper Saddle River, NJ: Pearson Allyn & Bacon.
- Tavşancıl, E. (2014). *Tutumların Ölçülmesi ve SPSS ile Veri Analizi (5. Baskı)*, Ankara: Nobel Yayınevi.
- Tezbaşaran, A. (2008). *Likert tipi ölçek hazırlama kılavuzu*. Ankara: Türk Psikologlar Derneği Yayınları.

Strategic Provision Of Staff And Facilities For Successful Delivery Of A Civil Engineering Technology Programme

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Abstract

The strength and competencies of teaching and supporting staff in an institution of higher learning should not focus on the academic programmes per se, but encompass the campus-wide efforts towards full implementation of outcome-based education, or more commonly known as OBE. This paper examines the strategic pairing of staff and facilities in the successful implementation of an undergraduate Civil Engineering Technology programme. The teaching staff comprises of professors, associate professors, senior lecturers, lecturers, instructors and the tenured tutors awaiting pursuit of postgraduate degrees. The instructors are especially equipped with industrial experience and exposure, often of former employment in related industrial fields and are therefore well-versed with workplace expectations. Teaching load is analysed with relevance to staff-student interaction for effective learning, coupled with the student advisory and counselling system for continual monitoring of the academic performance. The teaching staff are also encouraged to engage in professional development, such as via industrial attachment, consultancy and research collaboration to strengthen the practical-cum-industrial component of the engineering technology programme. In addition, staff assessment is conducted by both the university and the students to ensure unbiased quality monitoring. Facilities-wise, common academic services like library, lecture halls and rooms, laboratories and workshops are complemented by an integrated information technology system and other daily amenities such as residential colleges, banking services, healthcare centre, transportation, sports and recreation. In short academic excellence cannot be achieved by good teaching and learning techniques alone. It needs to be underpinned by an organized, well-grounded supporting system which includes comprehensively every façade of a student's life on campus, from within and outside the lecture rooms, to ensure effective and successful delivery of the programme in grooming balanced graduates.

Keywords: *Staff, facilities, university, engineering technology, industrial exposure, teaching workload, assessment*

Introduction

Staff and facilities are arguably the most important components for the successful delivery of an academic programme in any institutions of higher learning. While sometimes considered secondary to curriculum and syllabus of high standards, poor knowledge transfer mechanisms coupled with inadequate facilities would make delivery of the programme's contents ineffective, if not impossible. As globalisation created new challenges to institutions of higher learning, the onus of good programme delivery inadvertently falls on the academic staff specifically, and the supporting staff in general (Mushemeza, 2016). Lack of motivation among staff could be attributed to low morale primarily related with unsatisfactory rewards (Hijazi *et al.*, 2017). Based on 157 samples from 7 private universities in Nigeria, Akafo & Boateng (2015) reported that rewards in the forms of wage, bonus and compensation form a positive and direct relationship with job satisfaction. Academic staff are also subjected to unprecedented anxiety and uncertainty, in particular those under contractual tenures at universities (Bodla *et al.*, 2014). On the other hand, although university education is recognised to meet the foremost needs of learning opportunities, it is the institutional facilities that draw and retain students upon enrolment in the demand-driven higher education sector (McLaughlin and Faulkner, 2012). As pointed out by Milne, the 'out of sequence' learning pattern today has phased out traditional lecture delivery in rigid, sequential manner, where students of this digital age are more inclined to overlap learning and intellectual discourse via different media, technology and communities simultaneously (Milne, 2006). Moreover, students being young adults in general regard services such as healthcare, wellness and fitness as being necessary to help them maximize their university experience (Allen and Ross, 2013). This paper examines the strategic provision of staff and facilities for an undergraduate Civil Engineering Technology programme at UTHM, with elaborations on the engagement, monitoring and enhancement mechanisms introduced to ensure good, effective delivery of the programme.

Strength And Competencies Of Teaching Staff

Academic staff consists of Professors, Associate Professors, Lecturers and Instructors. The different positions denote academic qualification levels and past experiences / achievements in teaching and learning, research, publications, consultancies, community services and other related works. The general qualifications and competencies of the Academic Staff are as follows:

- a. Professor
 - Possesses Master or Doctorate qualification.

Demonstrates exceptional performance in teaching and learning, supervision and research activities as evidenced by academic publications as well as outstanding community services.

b. Associate Professor

Possesses Master or Doctorate qualification
 Demonstrates excellent performance in teaching and learning, supervision and research activities as evidenced by academic publications as well as outstanding community services.

c. Lecturer

Possesses Master or Doctorate qualification
 Actively involved in research activities, including presentations and showcases in conferences, seminars and related exhibitions, academic publications as well as community services.

d. Engineer Instructor

Possesses diploma or degree qualification with substantial relevant working experience in industry.

Table 1. Academic qualifications of teaching staff.

Academic Qualifications	Number of Staff
Doctorate	14
Masters	9
Bachelor	2
TOTAL	25

Table 2. Academic positions of teaching staff.

Post	Number of Staff
Professor	-
Assoc. Professor	6
Sr. Lecturer	5
Lecturer	7
Sr. Eng. Instructor	6
Eng. Instructor	1
Assistant Eng. Instructor	2
TOTAL	27

Table 3. Session breakdown and distribution of teaching staff.

TEACHING STAFF	Academic Session			
	2013/14	2014/15	2015/16	2016/17
(a) Total number of full-time staff (including those servicing other programme, staff on study or sabbatical leave & tutors)	2	3	3	8
(b) Full-time equivalent of teaching staff servicing other programme	1	2	2	3
(c) Teaching staff (on study or sabbatical leave)	0	0	0	0
(d) Tutors	0	0	0	0
(e) Effective full-time teaching staff = (a)-(b)-(c)-(d)	1	1	1	5
(f) Full-time equivalent of teaching staff from other programme servicing this programme	14	12	12	17
(g) Full-time equivalent of part time teaching staff	1	1	1	1
Full-Time Equivalent Teaching staff (FTES) contributing to Staff: Student Ratio = (e)+(f)+(g)	16	14	14	23

The academic staff of this programme, are adequately qualified and experienced and would be equipped with the required competencies for effectiveness delivery of the programme's curriculum. The summary of academic qualifications of teaching staff in the programme is shown in Table 1 and the summary of the posts held by full time Academic Staff is shown in Table 2 respectively. A breakdown in terms of numbers of academic staff (full-time, part-time and inter-programme) for 2013/2014 up to the year 2016/2017 is shown in Table 3.

The academic staff are well informed of the PEOs, PLOs, CLOs and the implementation of OBE, and always encourage active student's engagement in the learning process via outcome-based approach. A series of OBE workshops were organized at University and Faculty levels to enhance the staff's understanding and outlook of the teaching and learning method. A committee has been specially formed to organize teaching and learning activities related to OBE within the Faculty. It is compulsory for all new academic recruits to attend to an OBE induction course organized by the Centre for Academic Development and Training (CAD), which provides

insights to the fundamentals of teaching and learning in line with the OBE philosophy. A pass in the compulsory course is part of the requirements to be appointed as a permanent staff at UTHM. A good mix of OBE activities are regularly organized by the committee to inculcate the philosophy and practice of OBE, such as seminars, stakeholders' review meeting and committee meetings. In order to be sure of the attainment of outcomes predetermined for each student, each programme has mapped each course with appropriate level of cognitive, psychomotor and affective domains in Bloom's taxonomy as well as soft skills required for that particular course. Also, at the beginning of each class session, the learning objectives and outcomes (PEOs, PLOs, and CLOs) are being highlighted and explained, so that students are informed and aware of the learning outcomes expected of them.

Teaching Workload And Student-Staff Interaction

The overall staff workload is established according to the staff's academic background, industrial experiences and field of competencies. The average teaching load (teaching hours per week) for academic staff in this programme is 11 hours per week. Table 4 shows the ratio of staff and student for the four (4) academic sessions. Student-staff interaction is at its optimum level as the Faculty has a low staff/student ratio, i.e. better staff-student engagement and interaction leading to more effective learning among the students. The academic advisory system is implemented to monitor individual student's academic performance and wellbeing / welfare in general. Academic advisors are appointed among the academic staff, with the responsibilities of advising and counselling students in academic and to a certain extent, personal life matters. The academic advisory system has been made more accessible by going online, i.e. a university-wide system known as PA-Online (e2.uthm.edu.my/ppa/pa/). The personal information of the student, academic record (transcripts), past academic qualifications and other relevant data are recorded in the system, enabling the academic advisor to have close monitoring of the performance of each student without excessive interference.

Table 4. Ratio of teaching staff to students.

Academic session	2013/2014	2014/2015	2015/2016	2016/2017
No. of Full Time Equivalent Teaching Staff	16	14	14	23
No. of Students in Program	29	29	77	124
Staff to student ratio	1:2	1:2	1:6	1:5

All academic staff are involved in various committees as members in the Faculty's management system. The purpose of these committees is mainly on the smooth running of the academic programmes as well as to provide support in the management and organisation of various activities at the Faculty level, while giving exposure to the academic staff in organizing academic and non-academic activities with internal (e.g. inter-faculty programmes) and external partners (e.g. industry, professional bodies, other institutions, etc.). Some of the committees in the Faculty include:

- Academic Management Team
- Curriculum and Syllabus
- Industrial Training and Mobility
- Timetable
- Postgraduate Studies
- Outcome-based Education
- Promotion and Website
- Academic Advisory
- Research and Consultation
- Publication
- Quality Assurance (MS ISO 9001:2000)
- Laboratory Physical Development and 5S
- Staff Development
- Academic Development and Training
- Student Affairs and Alumni

Professional Exposure And Development

Professional development is vital element in enhancing the experience and knowledge amongst the academic staff. This includes participation in professional courses or seminars organized internally or by other agencies. The University encourages its staff to disseminate their research findings at national and international conferences. The University also encourages staff to enhance their technical experience and linkages through consultancy work, such as extending their services and expertise to industries of the related field. In addition, industrial visits are routinely arranged for all academic programmes to promote staff/student-industry interaction as well as acquisition of industrial exposure. This is also achieved via invigilation of students at Industrial Training.

To further enhance research and development as well as innovation, the Faculty has established a centre of research: the Advanced Technology Center (ATC) as a hub for research innovation and consultation activities at the Faculty. ATC comprises of 11 focus groups, encompassing a comprehensive field of research and industrial focus studies, as shown in Table 4. Through this medium, the academics are actively engaged in academic publications, including books, technical entries in conference proceedings and journals at both national and international levels. To further promote the research acculturation, the Faculty regularly reminds and encourages staff to apply for research grants by internal and external sources.

Staff assessment-wise, The University incorporates annual assessment of staff performance, including the aspects of teaching, supervision, research, publication, participation in professional, as well as community involvement. The assessment form used to evaluate the staff performance can be accessed through <http://prestasi.uthm.edu.my>. To get the evaluation or feedback from the students on matters relevant to their academic environment, the University has established several working systems, including: *Sistem Penilaian Pengajaran Staf Akademik dan Kursus (SPARK)* – in which students get to give comment and evaluate their satisfaction level of the lecturers and courses.

In addition, *Sistem Saluran Aduan Dan Cadangan Dalaman (SACAD)* – SACAD is an online application developed for staffs and students to lodge for complaints or suggestions directly to University administration. SACAD is a medium to enhance the efficiency and improvement of the university's governance system by getting the feedback for the provided services. The Secretariat serves to plan and monitor all activities related to the complaints and provide the internal proposals to the university so that all the shortcomings and weaknesses will be overcome and the quality of service can be continuously improved.

Strength And Competencies Of Supporting Staff

The supporting staff are divided into two categories, namely technical and administrative. The administrative staff are under the Dean's Office and led by the Assistant Registrar, who assists the Dean in administrative and financial matters of the Faculty. The administrative staff consist of 1 Administrative Officer, 2 Assistant Administrative, 2 Assistant Administrative Officers, 1 General Assistant, 2 Office Secretaries and 1 Senior Assistant Administrative Officer. On the other hand, the technical staff assist the Head of Laboratory (either instructor or lecturer) in handling the equipment in the laboratory, especially in terms of maintenance and services as well as preparation for teaching and research purposes. Currently the technical staff assisting the programme consist of 2 Assistant Engineers (departmental), 2 Assistant Architect (departmental), 2 science officer (shared) and 12 Assistant Engineers (shared). Table 5 summarizes the positions held by the supporting staff for the programme.

Table 5. Focus groups under ATC for research and innovation activities.

No.	Focus Group	Integrated Niche Area
1.	Green Environmental Technology	- Wastewater - Solid waste - Sludge and soil - Microbiology - Air quality
2.	Sustainable Green Building Technology and Management	- Green building - Applied science - Maintenance - Rehabilitation - Construction
3.	Automation and Control Technology	- Artificial intelligence - Neural networks - Fuzzy logic - Machine searing - Optimization for vision and learning

Table 6. Technical and administrative personnel constituting the supporting staff.

Supporting Staff	Position	Numbers in 2017
Administrative	Administrative Officer	1
	Assistant Administrative	2
	Assistant Administrative Officer	2
	General Assistant	1
	Office Secretary	2
	Senior Assistant Administrative Officer	1
Technical	Assistant engineer (civil departmental)	1
	Assistant Engineer (shared)	0
	TOTAL	10

The ideal and recommended staff to lab ratio of 1:1 notwithstanding, due to unavoidable staffing constraints, the current ratio for the Programme is understandably short of being favourable. At present, a technical staff is assigned to oversee the operations of 4 laboratories. Nonetheless each laboratory is managed by a Head of Lab, who is appointed from among the academic staff. Therefore, each laboratory is being jointly monitored and managed by an academic staff and a shared technical staff. Also, postgraduate research students (master's and PhD) are regularly recruited to assist in the laboratory sessions, to ensure good one-to-one group demonstration of the experiments involved, with post-lab session guidance and assistance. The postgraduate students are engaged either via paid schemes, or as part of their obligation as recipients of scholarships for their respective postgraduate studies. The exercise apparently kills two birds with one stone, i.e. the undergraduate students gain direct assistance

from the seniors, while the postgraduate students gain experience in teaching as well as develop soft skills in the semi-voluntary activity.

In addition, the concession signed between UTHM and SDPS (Sime Darby Property Selatan Dua) stipulates a 2-decade long of maintenance and services of the major laboratory facilities. This contractual relationship allows the Faculty to carry out regular and periodical maintenance works as well as repairs and services of technical faults of the equipment installations in a systematic manner. In other words, the shortage of technical staff in the management of the laboratories is also partially mitigated by the maintenance system in place.

The current practice and situation described above have not escaped the Faculty’s attention. Request for additional technical staff has been forwarded the Registrar to make amends to the number of staff required in the laboratories. However due to financial constraints and other inevitable factors, the recruitment of new staff process has been gradual and on-going.

Teaching And Learning Facilities

In 2016, UTHM has successfully obtained 3-star rating for excellence (overall) in the 2016 QS Star Rating assessment (Figure 1 **Figure C6-1**). Other audit criteria in the QS Star Rating system is the University’s facilities, Teaching and Innovation respectively, especially in terms of supporting teaching and learning as well as research activities of the institution’s community. The 5-star ratings were awarded to the University for Facilities, Teaching and Innovation in the audit exercise of the same year is evidence of UTHM’s commitment and preparedness to provide the best learning environment for students.



Figure 1. QS Stars Rating: 5-star for facilities at UTHM.

The facilities are not entirely for T&L purposes alone, but also include those necessary for students’ convenience and wellbeing in general. Adequate to cater for the needs of over 15,000 students, the living, teaching and learning facilities are offerings of top-notch quality and value-for-money in the literal sense. This comprehensive infrastructure includes the library, respective faculty buildings equipped with the lecture rooms, laboratories, workshops and space for other student activities, common lecture halls, sports facilities (including an Olympic-size swimming pool) as well as affordable residential colleges or hostels. Other facilities comprise of a bank and teller services, a mosque and prayer rooms, bookshop, convenience stores and clinic.

Despite its location in the suburb, the University strives to create a vibrant, dynamic and accessible learning environment with the necessary amenities for students’ everyday living. Therefore, it goes without saying that it is a source of great pride for the University to receive the QS Star-Rating, especially in Facilities, which effectively puts UTHM at par with other well-endowed and more longstanding local or foreign institutions in and outside the country. Following are detailed accounts of the facilities mentioned earlier:

i) Teaching and Learning Facilities

Lecture halls and rooms of various sizes, seminar rooms and examination halls are fully air-conditioned rooms and equipped with suitable audio-video equipment, such as LCD projector, visualizer and PA systems for the larger rooms. Maintenance services are just a phone call away where the contact details of the maintenance team are displayed in each of these rooms and halls.

ii) Library

The Tunku Tun Aminah Library, named after the princess of the current Sultan of Johor, covers a splendid 16,000 square meters of floor area, with a storage capacity of 300,000 books and can comfortably accommodate 3,000 users at any one time. The Library provides a spacious and conducive learning environment with 118 carrel rooms, 40 discussion rooms, 2 seminar rooms, a postgraduate research room, an auditorium, a special reference room, a journal room and a 24-hour reading room. An extensive database of print and digital resources to support teaching, learning and research activities are on offer at the Library. At present, the Library has acquired over 230,000 copies of books, 15,000 theses and 25,000 items of audio-visual materials. There is also an active subscription to

24 packages of database, e-books and 170 title of e-journals. The collections are in general of open access and classified according to the Library of Congress Classification (LCC) system. In addition, the library has a growing database of scanned documents, which currently archives over 5,000 scanned documents such as journal articles, conference papers and exam papers available in PDF format. Further information on the Library services can be found at <http://library.uthm.edu.my/v3/>.

iii) Information Technology System

The Information Technology Centre or Pusat Teknologi Maklumat (PTM) goes as far back as December 1994, functioning initially as the provider of computer services for students and staffs, but has today expanded to the provision and management of university-wide ICT facilities, including the related infrastructure, hardwares and softwares. PTM is fully equipped with a wide campus link based on an advanced fiber optic backbone supported by a 3Com Net Builder II Router, MSH Hubs and Switch Hub. This link is connected with the outside world via a leased line of 2Mbps speed. Controlled by a central server system with the Avaya P550 network engine, the system is able to support data up to 100Mbps on the Fast Ethernet Technology. To cater for the growing needs of the University, the system is currently in the process of being upgraded to GBit technology with the capacity to reach a maximum of 1000 Mbps speed. The development of this high speed link system is essential for supporting high resolution video streaming, in line with the University's concerted efforts towards enhanced online outreach in terms of programme delivery, global connectivity and access. In addition, wireless university-wide internet service is readily accessible by the University's community and guests 24-7. Further information on It services of the University can be found at <https://ptm.uthm.edu.my/>.

All students and staff are assigned personal email addresses based on the University's domain, as the official channel for dissemination of information and notifications, and as the primary means of electronic correspondence in general. On continual improvement of services, PTM also provides several Microcomputer and Unix Workstation laboratories as connected to the Novell and Unix server respectively with a University-wide access. Technical advice and assistance are always at hand for staff and students alike, especially in IT matters for T&L purposes. Short courses are regularly organized too as an initiative to encourage the usage of the latest computer and software technology.

iv) Laboratories and Workshops

The Faculty has several state-of-the-art laboratories and workshops facilities to support T&L activities. Health and safety of users at these facilities are strictly observed and monitored with regular maintenance and updating of the relevant equipment, procedures and training. In relation to the Programme, these facilities enable students to perform experiments and to conduct basic research work at course and FYP levels. These facilities for practical and hands-on sessions are rudimentary to the Engineering Technology programme in grooming future technical graduates of balanced technical and soft skills.

Overall, these laboratories and workshops are equipped with testing and measuring equipment, various supporting apparatus and instruments, machineries, computers with relevant softwares installed as well as for data recording and analysis purposes during the practical session. Practical sessions in these facilities give students the opportunity to verify theories and principles taught in lectures, to examine the practical implications of theoretical frameworks, and to relate textbook materials and field implementations for enhanced understanding of the subject matter. The facilities also expose students to the fundamental tests, measurements and standards commonly adopted in the related industries. This ensures graduates to make a smoother varsity-to-market place transition upon completion of the Programme, giving them a better leverage against others in the competitive job market.

Living Sphere Facilities

i) Other facilities

The University is constantly improving the facilities to meet the needs of T&L and general wellbeing of staff and students. In addition to the main facilities described above, other facilities available for the convenience of the University's community include the following:

- i. Transportation
- ii. Residential colleges
- iii. Medical and health care services
- iv. Sports and recreational facilities
- v. Cafeterias
- vi. Mosque/Prayer rooms
- vii. Banking services
- viii. Bookshop
- ix. Convenience store

ii) Banking Services

The University has a fully operational Bank Muamalat branch on campus, and a banking kiosk equipped with teller machines for several local banks, e.g. Bank Rakyat, CIMB and others. The banking kiosk is located adjacent to the University's main bus stop for ease of access to the students.

iii) Residential Colleges

The residential colleges aim to provide affordable living quarters for the students and the facilities are mainly on campus or located in close proximity to the campus. The capacity of residential colleges at the Parit Raja and Pagoh campuses are approximately 7,000 and 6,000 students respectively. General amenities available at these living quarters include prayer and study rooms, cafeteria, visitor's room, photocopy kiosks and laundry services.

iv) Transportation

Transportation services by buses and vans are provided for the students by the offices of the Centre for Student Housing and Transportation (P2P). Shuttle services are available at fixed schedules to help in the mobility of students to and from campus, as well as within the University. The operation hours are 0700-2300 daily, except for weekends and public holidays). The transportation services provided are especially useful for students without personal vehicles, while contributing to a 'greener' campus where the number of vehicles on campus are reduced.

v) Cafeteria and Canteen

There are a number of cafeterias and canteens available on campus to serve as waterholes for staff and students alike without having to leave the University's compound, saving both time and transportation costs.

vi) Mosque

The University's mosque, Masjid Sultan Ibrahim, was named after the present Sultan of Johor. The house of worship can accommodate up to 4000 people, and is managed by the offices of the University's Islamic Centre, which is also located in the mosque. To cater for various activities related to Islamic studies, worship and spiritual development, the multi-function building is equipped with a number of specialized rooms, namely Al-Farabi seminar room, Al-Khwarizmi computer room, Harun Al-Rashid resource room, an open study / activity area for students, among others. At the Pagoh campus, a mosque is available as part of the shared facilities among other institutions at the education hub (UTM, IIUM and Politeknik Tun Syed Nasir). Prayer rooms are also provided at selected blocks of the campus for the convenience of staff and students.

vii) Sports and Recreational Facilities

The sports and recreational facilities are especially myriad to serve the various interests and needs of the students, namely track and field facilities in a mini stadium, an Olympic-size swimming pool, a couple of football fields, futsal court, rugby field, lawn bowl pitch, hockey field, tennis courts, badminton courts, basketball court, *sepak takraw* court, volley ball court and netball court. Similar sports and recreational facilities are also provided at the Pagoh Campus, though the accessibility is shared among the co-habitants of the education hub.

viii) Medical and Health care Services

Students and staff can seek medical attention or healthcare services at the in-house clinic named as University Healthcare Centre (PKU) for free. The clinic also provides emergency and outpatient treatments on weekdays with standard operating hours. The clinic is staffed by 3 medical doctors, 2 dentists and 3 medical assistants who work hand in hand with 9 nurses. There is also an ambulance service to cater for emergency cases.

ix) Bookshop

A bookshop owned by the University's Publisher is open daily for the patronage of all. A full range of the University's publications are on display and for sale. Students particularly find the service convenient to purchase textbooks or main reference books authored by the University's academic staff.

x) Convenience Stores

Four convenience stores operate on campus, selling provisions and goods for daily use and consumption of students in general. Fondly known as Coop Mart UTHM, the stores are managed by the COOP UTHM, and can be found strategically in the vicinity of Bank Muamalat, Arked, residential colleges Kolej Kediaman Tun Syed Nasir (TSN) and Kolej Kediaman Tun Dr. Ismail (TDI).

Conclusions

The discourse above illustrates the importance of complementing good academic and supporting staff with functional facilities and services to cater for the needs of students on campus. These may seem to be the execution

extensions of the academic curriculum, or supplementary pillars of the institution, but they are indeed the key components to enliven the education process, without which campus life would be unwholesome and incomplete. Nonetheless continual improvement and upgrading are necessary to maintain the level of conduciveness for the students in this tertiary education environment.

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References

- Akafo, V. & Baoteng, P.A. (2015). *Impact of reward and recognition on job satisfaction and motivation*, European Journal of Business and Management, vol. 7, no. 2, pp. 112-124.
- Allen, R. & Ross, C.M. (2013). *An assessment of proximity of fitness facilities and equipment and actual perceived usage by undergraduate university students: A pilot study*, Recreational Sports Journal, vol. 37, pp. 123-135.
- Bodla, A.A., Hussain, M. & Chen, C. (2014). *Determinants of job satisfaction in academic professionals in Pakistan*, Sukkur IBA Journal of Business and Management, vol. 1, pp. 20-39.
- Hijazi, S., Kasim, A.L. & Daud, Y. (2017). *Leadership styles and their relationship with the private university employees' job satisfaction in United Arab Emirates*, Journal of Public Administration and Governance, vol. 6, no. 4, pp. 110-124.
- McLaughlin, P. & Faulkner, J. (2012). *Flexible spaces... What students expect from university facilities*, Journal of Facilities Management, vol. 10, no. 2, pp. 140-149.
- Milne, A. (2006). *Designing blended learning space to the student experience*, Learning Spaces, D.G. Oblinger ed., Educause, pp. 11.1-11.15.
- Mushemeza, E.D. (2016). *Opportunities and challenges of academic staff in higher education in Africa*, International Journal of Higher Education, vol. 5, no. 3, pp. 236-246.

Strengthening The Perception Of Organizational Performance In Sport Management Studies

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Abstract

This paper analyses teaching and learning strategies that are applied in sports management studies in order to equip students with a strong perception of organizational performance in a sports context. Using the case study method, the aim is to suggest an educational model that would develop and strengthen the skills to allow students to assess and measure performance of sports organizations effectively. The model is conceptualized on the basis of the analysis of students' assignments using the Atlas .ti software with the purpose of identifying their perception of organizational performance concepts in sport after the completion of the core subjects of sport management studies. In the light of these findings, the reflection in terms of current educational models and subjects and their teaching and learning methods was also conducted. Upon the findings, the author proposes the inevitable changes that should focus on the classification of different managerial situations and cases in a variety of sports organizations (public, professional, non-profit) where the organizational performance measurement is of the utmost importance for their survival and further development.

Introduction

The professionalization of sports organizations meant application of business principles in the marketing of sports products, planning, human resource management, and other aspects of organizational activities. Performance management is one of the most important principles. The diversity of the missions of the sports organizations led to the development of various tools and criteria for evaluating their performance. Sports manager must, therefore, know the ways how to define, analyse and present performance in the environment of sports management.

Performance is generally understood as a combination of two criteria – efficiency and effectiveness. Efficiency is traditionally defined as an ability to achieve the aim of the institution. Effectiveness compares the number of means used for achievement of the results without considering user satisfaction. For private companies financial indicators and assets represent the basic synthetic measures of performance evaluation. In the case of non-profit organisations efficiency need not be relevant and effectiveness is a complex construct with an external dimension (external social performance).

Specific Evaluation of Performance in Sport and Sports Organisations

The definition of organizational performance in Sport is key to the proper understanding of the difference between

- the athlete and sporting performance that is measured by sport rankings and league tables and
- performance of the sport organization as a whole that is measured by key performance indicators of the sport organizations.

Evaluation of performance is based on criteria identical with business organisations, which reflects progress towards professionalism.

Due to the existence of specific features of sport there are also differences in performance evaluation derived from the fact that sport is not driven by the need to optimise profit; sports organisations follow a pair of conflicting missions, profit maximisation and avail maximisation, emphasizing rivalry of clubs and their desire to win.

Sport Performance Evaluation Indicators

Performance indicators in sports organisations differ from these of purely business organisations for there are multiple organisational goals related to the desire for sporting achievement, financial stability and social responsibility. Therefore sports organisations are driven by more or less clearly declared performance indicators related to one of the following areas: sport, economy and social.

The Study

Our study was realized in the three subsequent steps. Firstly, we conducted a review of relevant literature from sport management in order to understand the latest trends in the definition of the performance measures and performance management systems for public, professional and non-profit sport organizations. Secondly, a qualitative analysis of articles in sport management journals published in the years 2011-2015 using the Atlas.ti functionality of filter was carried out, with the aim of identifying the extent to which the two selected concepts suitable for performance management in sport – namely Balanced Scorecard and Performance Prism can be found. Both content analyses can influence and will be reflected in our understanding of how to design the education/course content of organizational sport performance within sport management studies. Finally a qualitative analysis of the students' assignments from the subject of Sport Management using coding techniques (Strauss, A. & Corbin,

J., 1998) and Atlas.ti software was performed in order to reveal the extent to which the current approach in teaching and learning organizational performance in sport reflects the desired learning outcomes, i.e. understanding of the strategic focus of performance measures and performance management system in sports organizations.

Findings

Approaches to Performance Evaluation in Sports Organisations

According to Hoye et al. (2012) the following approaches to sports organisation evaluation can be identified:

- 1) Performance management related to the organisation's objectives and intentions
- 2) Theory of sporting performance evaluation – from stakeholder perspective
- 3) Theory of sporting performance evaluation (input – output)
- 4) Multidimensional models of performance measurement

Multidimensional model is preferred in sports organisation performance evaluation, though, according to Winand (2014), for every sports organisation has many stakeholders with different ideas of what should be evaluated for the purpose of measurement of the organisation's effectiveness and performance.

When evaluating performance of sports organisations methods / models developed for organisations from other sectors, profit, non-profit and public, may be applied. The most popular and the most frequently applied methods / models include the following multidimensional models:

- Balanced Scorecard (Kaplan&Norton, 1992)
- The Performance Prism (Neely, Adams &Kennerley, 2002)

Balance Scorecard (Kaplan & Norton, 1992) emphasized not only financial indicators but also the overtaken indicators which can help identify many potential issues before their impact on the financial measures can be seen. The Balanced Scorecard model emphasizes four different aspects of the organisation where performance needs to be evaluated: finance, customers, internal processes and motivation to learning. Practical application of this model in evaluation of performance of a sports organisation [Table 1] is possible after setting indicators for the individual dimensions and their specification. What always matters is the particular strategy and vision of the given sports organisation and performance indicators in the balance scorecard may be made operational for both long- and short-term objectives.

Table 1: Example of application of Balance Scorecard model in sports organisation

Goals	Evaluation method	Plan	Activities
Financial objectives / performance			
Revenue portfolio extension (diversification)	% of various sources of financing in the budget	60 % of gains in the budget will come from sponsors	Club brand building Sponsor network building and extension
Increase of club membership base	Number of club members	25 % increase of membership base	Promotion, recruitment sports events
Customers			
Increase of fan satisfaction with services	Fan satisfaction level	15 % increase of fan satisfaction	Revision of all services on the basis of fan satisfaction Implementation of remedial measures Questionnaire-based inquiry using SERQAL model
Reduction of complaints of sports events visitors	Number of complaints	20 % reduction of the number of complaints	Introduction of processes for early identification of critical points in services and their addressing Adoption of a system for on-the-spot troubleshooting
Learning and development / growth			
Increase of key skills of employees	Number of training courses and practices	Increase %	Preparation and implementation of educational and training plan

			Introduction of a system of education and training effectiveness evaluation
Fluctuation reduction	Fluctuation (measurement methods)	Decrease %	Personal motivation interviews with key employees Measures for increase of employee motivation and satisfaction
Effective processes			
Reduction of new member recruitment costs	Costs of recruitment	Reduction %	Involvement of volunteers in recruitment Use of information system and social media for recruitment
Streamlining of the process of communication with fans	Number of target groups	Increase of the target group number	Introduction of CRM (customer relationship management) to work with target groups of fans

Source: Nová et al. (2016) pursuant to Balance Scorecard Framework (Kaplan&Norton, 1992)

Performance Prism

The authors of the Performance Prism (Neely et al., 2002), unlike those of the Balance Scorecard, emphasize the key role of the stakeholders in achievement of success of the organisation. The expression “prism” is used to emphasize the fact that the model uncovers hidden elements of the organisation affecting its performance. The model defines five basic questions for the organisation management evaluating performance of their organisation [Table 2].

Table 2: Evaluation of organisation performance aspects

Performance aspect	Question for management
Stakeholder satisfaction	What are the needs and desires of our stakeholders?
Stakeholder asset/contribution	What can our stakeholders give us?
Strategies	What strategies are needed to satisfy stakeholders’ needs?
Processes	What processes need to be introduced to satisfy stakeholders’ needs?
Skills	What practices, people, technologies and infrastructure are needed for full implementation of processes and strategies?

Source: Neely et al., 2002

In our opinion, this model is very fitting for application in sports organisations with their broad portfolios of stakeholders [Table 3].

Table 3: Example of application of the Performance Prism in sports organisation

Stakeholders	Players	Fans	Media	Employees	Sponsors
Stakeholders satisfaction (what are their expectations in relation to the sports organisation)	Game success, adequate salaries and benefits, low injury rates	Game equality and excitement, high proportion of victories to losses, complex experience	Mass market, high level of public interest	Adequate salaries and benefits, employment security, professional development	Positive club or association reputation, brand awareness and recognition
Strategies	Do we possess adequate training, playing and financial strategies to achieve sports success and	Are the strategies of sports event preparation focused on the needs and desires of fans?	Are our media strategies in harmony with the media market?	Do we possess adequate human resource management strategies?	Do we create and implement strategies of brand building and cooperation with sponsors?

	financial stability?				
Processes	Do our processes support our sporting and financial strategies?	Do our processes support quality of services to fans for their engagement?	Do our processes support effective work of and with media?	Do our processes support application of effective methods of work with human resources?	Do we have processes in place for support of communication with sponsors and their presentation?
Skills	Do we possess skills for utilisation of increased effectiveness by means of technologies and innovations?	Do we offer the correct portfolio of services and quality human resources?	Are we able to increase our media coverage?	Are we able to support HR strategy?	Do we possess skills for targeted building of partnerships with sponsors?

Source: Nová et al. (2016) pursuant to Performance Prism Framework (Neely et al., 2002)

National Sport Management Bodies and Organisations Effectiveness Evaluation

Frameworks for organisational management of performance of national sports organisations and sport management bodies have so far been the most profoundly examined area of performance in sport.

Winand et al. 2010 design a model for measurement of organisational performance of management bodies for Olympic sports, distributing their objectives among five main dimensions [Table 4].

Table 4: Model of organisational performance of sport management bodies

	Dimension	Sub dimension	Objectives
Strategic goals	Sport	Elite sport	International sports success Increased participation of athletes in international competitions Improvement of services for athletes Increased sporting activities for members
	Customer	Sport for all Sporting values and service for the society Development of members	Maintenance of sporting values in the society Improvement of non-sport services for members Member acquisition Member loyalty development
Operative goals	Communication and an image	Image Communications	Dissemination of positive image of individual sports in media and in the society Dissemination of positive image of individual sports among members Improvement of club's internal communication towards members Improvement of communication establishment towards members
	Finance	Financial resource management Financial survival	Fundraising Finance management Management of self-financing Management of financial independence on public authorities
	Organisation	Staff skills Internal functioning	Improvement of office and sports staff skills Improvement of volunteer skills Improvement of internal functioning of the central office Improvement of organisational atmosphere in the central office

Source: Translated and adapted by the author pursuant to (Winand et al., 2010)

Performance Evaluation of Non-Profit Sports Organisations

A unified model for performance evaluation of non-profit sports organisations is offered by Winand et al. (2014), [Table 5].

Table 5: Unified model for performance evaluation of non-profit sports organisations

EXTERNAL ENVIRONMENT			
INPUT	THROUGHPUT		OUTPUT
Fundraising	Financial	Sports programmes	Achievements
Size Volunteers Technical staff Members	Resource management Independence External communication and contacts	Elite sport Mass sport Organisation operation Internal atmosphere Process effectiveness	Success of elite sport Mass sporting Services for members, athletes, society Services provided
Physical resources	Stability, Research support, Human resource support and recognition, Planning and flexibility		Financial objectives Ethical objectives, Safety, Recreational goals
PERCEPTION			Ethical values
Internal stakeholders: Management board members, salaried office staff, salaried research and technical staff, coaches, members, elites			FEEDBACK
External stakeholders: sponsors, governmental agencies, top management bodies			Internal Satisfaction
			External Image

Source: Adapted by the author pursuant to (Winand et al., 2014)

Evaluation of Performance of Sport Management Bodies and Organisational on Local Level

There is no theoretical framework for evaluation of performance of sport management bodies and organisations on the local level. However, in countries like Great Britain, Australia, New Zealand, Canada etc., i.e. where the New Public Performance model is applied, there are various models for evaluation of performance and quality of services of local sports organisations applying for public finance also on the local level. In addition individual sports organisations issue activity evaluation criteria for their local clubs in case they want to apply for financial contributions to their activity [Table 6].

Table 6: Examples of evaluation of performance of sports organisations on local level

<p>Organisational management of performance in sport on local level</p> <p>1) Measurement of Performance for Sport Development – Good Practice Guide for Local Authorities (2001) published by Sport England</p> <p>Sporting outcomes (range of participation and skills development opportunities available ; levels and frequency of participation in sport; levels of (voluntary) involvement in sport leadership, coaching , officiating and administration; achievement of sporting success, attitudinal change)</p> <p>Process outcomes (strategic and development plans; range/nature of partnership developed; proportion of resources from other agencies; satisfaction of individuals , including users, partner organizations and stakeholders, awareness level)</p> <p>Service outputs (location, number and accessibility of facilities provided; number of users/ visits; frequency of attendance; number of people trained ; number of organisations assisted)</p> <p>Process outputs (quality management system accreditation; methods of delivery and processes adopted; speed of response; satisfaction with staff)</p> <p>Equity measures (ethnicity, gender, socio – economic group, age)</p> <p>Social, economic and environmental outcomes (health and well – being ; economic development and regeneration; environment and sustainability, community safety; educational attainment and lifelong learning; equity and inclusiveness; quality of life)</p> <p>2) Model SPARC-Sport And Recreation New Zealand, Activities in Performance Management in Sport - New Zealand – considered an instrument for development and assessing the following criteria: Management; Planning; Sport management (internal); Human leadership; Customer focus; Method of sporting opportunity provision</p> <p>3) AFL Community Club Improvement Program</p> <p>The Australian Football League recognises that volunteers and administrator active in sports clubs significantly contribute to success of Australian football, and that the demand placed on club volunteers and administrator increases together with the need to operate the clubs in the professional manner.</p>
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AFL programme for improvement of local club activity was developed specifically for helping the clubs review their current operation and identify opportunities for improvement.
 After the programme completion, the clubs receive a detailed report with information about the good practice to help them formulate action plans for improvement of the club activity, operation and management in future.
 By means of the programme the clubs can receive recognition for good/excellent club administration:
 The club quality level suggests effective club administration
 Gold Club Quality – level acknowledges that the club management is excellent

Source: Adapted by the author from: <https://www.oag.govt.nz/2010/sparc/docs/sparc.pdf> ;
<http://www.aflcommunityclub.com.au/index.php?id=13>;
<http://www.toolkitsportdevelopment.org/html/resources/3F/3F087249-B1C6-4BFA-BB63-42DF308CAC30/best%20value%20through%20sport%20performance%20measurement.pdf>.

Evaluation of performance in sport often involves overlapping of performance and quality assessment systems. This phenomenon was described by Nová (2014), who also suggested an Integrated Model for Quality and Performance Management in Non-Profit Sports Organisations.

A qualitative analysis of sport management journal articles

A qualitative analysis of sport management journal articles (Sport Management Review n= 222, Journal of Sport Management n= 206, European Sport Management Quarterly n= 102) published in the years 2011-2015 using the thematic coding (and Atlas.ti functionality Word Cruncher was carried out. The aim was to identify the extent to which two selected organizational performance concepts (Balanced Scorecard and Performance Prism) have been researched. The analysis showed that the expression / code balanced scorecard and performance prism and their derivations were found in these articles: Hagen Wäsche and Alexander Woll (2013) in their study provided an understanding of the organization and management of Regional Sport Tourism networks and in one case the balanced scorecard was used as the strategic management tool. Ian O’Boyle and David Hassan (2014) examined the situation in the field of organisational performance management and measurement within non-profit sport organisations and they stated that an area of research that is not addressed in any study of organisational performance in NPSOs is the use of traditional business performance management tools such as The Balanced Scorecard (Kaplan & Norton, 1992, 1996), The Performance Prism (Neely et al., 2002; O’Boyle & Hassan, 2013), or any derivative of such tools. Ian O’Boyle (2015) examined the issue of developing and implementing performance management tools – Balance Scorecard and Performance Prism that can potentially help national sport organisation managers.

Analysis of students’ assignments

The study programme Sport Management at the Faculty of Sport Studies Masaryk University (FSPS MU) is delivered in cooperation with the Faculty of Public Administration (teaching the basics of management, marketing, economics and HRM). On the basis of these general management subjects the Faculty of Sport Studies delivers courses with the endeavour of teaching students how to apply the acquired knowledge in a sport context especially when it comes to organizational strategy and performance of sport organizations, see [Table 7].

Table 7: Delivery Logic of the organizational body of knowledge in Sport Management at FSPS MU

Subject /course taught in Sport Management Studies	Content related to organizational strategy and performance
Basics of Management	Definition and basic characteristics of organizations’ strategy and business performance
Management in Sport	Organizational strategy and organizational performance within a sport context, interrelation between the organizational strategy of sport organizations and performance measurement and performance management systems in sport organizations
Case Studies in Sport Management	Reflection and application of strategy-based performance theory in practice based on specific case studies

We examined the assignments of 36 undergraduate students who passed the subjects Basics of Management and Sport Management (spring semester 2018). A condition for completing the subject of Sport Management was the writing of the assignment respecting the following instructions for the part of the assignment that was related to organizational performance:

- 1) Select a sports organization, briefly describe its mission, vision, and strategy
- 2) Study in detail the Balanced Scorecard by Kaplan and Norton (1992) and suggest performance indicators for your organization. Fill in, at your own discretion, the indicators suggested by Hoye et al. (2012) and

Nová et al. (2016). Justify your proposal. Create the Performance Prism for your organization (by Nova et.al, 2016)

The content analysis of students' assignments using a coding method (Strauss and Corbin, 1998) and Atlas.ti software was conducted so as to assess their perception of the organizational performance

The examination was guided by the following questions:

- To what extent can the students apply critical thinking with regard to organizational performance in the chosen sport organization? and
- Are they able to implement two well-known frameworks (Balanced Scorecard and Performance Prism) in the chosen sport organization?

To answer the above-mentioned questions in the process of the content analysis, 9 general codes have been suggested that classify the extent to which the students were able to operationalize the prescribed performance tools for the chosen sport organization [Table 8].

Table 8: Extent of the utilization of the Balanced Scorecard (BSC) and Performance Prism (PP) for the chosen sport organization in the students' assignments

Code	Comment	Grounded
Balanced scorecard mentioned not used	Students fail to operationalize the BSC for sport context	10
Balanced scorecard utilized	Students used the dimension of the BSC but failed to link it to the strategy of sport organization	7
Balanced scorecard utilized accurately	Students managed to operationalize the all dimensions of the BSC in variations and linked them to the strategy of sport organization	13
Balanced scorecard utilized with limited extent	Students managed to operationalize all dimensions of the BSC and linked them partially to the strategy of sport organization	6
Performance Prism mentioned not used	Students fail to operationalize the PP for sport context	2
Performance Prism not mentioned not utilized	Students have not demonstrated either knowledge or operationalization of PP	9
Performance Prism utilized	Students used the dimension of the PP but failed to link it to the strategy of sport organization	12
Performance Prism utilized accurately	Students managed to operationalize all dimensions of the PP for a variety of stakeholders and linked them to the strategy of sport organization	11
Performance Prizm utilized with limited extent	Students managed to operationalize all dimensions of the PP for limited stakeholders and linked them just partially to the strategy of sport organization	2

Almost 31% of students successfully used the Performance Prism and more than 36% successfully used the Balance Scorecard. 16% of students used the BSC to a limited extent and more than 5% used PP within a limited extent.

What is challenging from the pedagogical point of view is the fact that more than 33% of students were able to recognize the importance of the PP tool and utilized it but failed to link it to the strategy. This statement is valid for more than 19% of students when it comes to the utilization of the BSC.

Analysing the accurate operationalization of the BSC and PP within the variety of the sport organizations chosen by students for their assignments, it is obvious that the best results in setting the performance measures were achieved for non-profit local sport organizations and 1st league for profit sport organizations [Table 9].

Table 9: Accurateness in applying the performance models for various types of Sports Organizations

Type of the Sport Organization N=36	BSC mentioned not used n=10	BSC utilized n=7	BSC utilized accurately n=13	BSC utilized with limited extent n=6	PP mentioned not used n=2	PP not mentioned not utilized n=9	PP utilized n=12	PP utilized accurately n=11	PP utilized with limited extent n=2
Non Profit local N= 18	5	3	8	2	0	4	8	5	1
For Profit local N= 4	0	2	1	1	0	1	2	1	0
1st league For Profit N=7	2	1	3	1	0	2	2	3	0
Non Profit national Sport Association N=5	1	1	1	2	1	1	0	2	1
For Profit national for e Sport ; N=1	1	0	0	0	0	1	0	0	0
For Profit national Olympic Centre N=1	1	0	0	0	1	0	0	0	0

Conclusions

Although research and practice guides referring to the organizational performance in sport are sufficient there are no studies available that shed light on how sport management students understand or are taught this important topic. This qualitative case study offers an initial exploration of how the organizational performance for a variety of sport organizations is learned and taught in sport management studies. After careful analysis of the transcripts from the undergraduate students' assignments, their preparedness to operationalize the most popular business performance models, namely the Balanced Scorecard and the Performance Prism in a real sport context was examined.

To achieve a better understanding of organizational performance in sport and to equip the students with the relevant knowledge and skills the current approach regarding the teaching and learning of these crucial topics was revisited. On the basis of this and also our findings the starting point is to set up a competence framework in the area of organizational performance. Based on our findings the following competences and skills must be demonstrated by students at the end of the respective courses:

- Demonstrate the knowledge of the respective performance models from business and the sport industry that are applicable within a variety of sport organizations
- Manifest the ability to determine the performance management system and key performance indicator sets considering the organizational strategy
- Determine relevant stakeholders, their relationship with the sport organization and to be able to identify their expectation
- Be able to ensure that the necessary information is available to operate and improve the organizational processes and to monitor, analyse and evaluate the performance of the overall organization
- Set up appropriate measures to measure and monitor key indicators to demonstrate the organization's performance in the light of the organizational strategy
- Ensure that data and information are sufficiently accurate, reliable and secure
- Analyse and evaluate data and information using suitable methods
- Measure performance and provide performance feedback to stakeholders so as to enhance improvement initiatives

Bearing in mind the results of the analysis of students' assignments, the structure of the sport management study programme and current teaching and learning strategies that are considered as critical elements in teaching and learning organizational performance, it is advised to introduce the following measures in order to successfully achieve the above-mentioned learning outcomes.

- A. Content change within the study programme structure** led by the need to provide the space for single subjects focused on organizational performance in a sport context, namely:
- Organizational performance and sustainability of Sport Organizations
 - Critical Reflections of Sport Management Practice in the light of the performance concepts (Balanced

Scorecard; Performance Prism etc.)

- The role of Sport Business Intelligence and Integrated Management System in a sport context in relation to the organizational performance

The content changes can be theoretically underpinned by the opinions of the experts in the area of cognitive psychology who claim for providing the students with sufficient subject matter knowledge base and guidance so to allow them apply fully and encourage the critical thinking (Kirschner et al., 2006).

B. Adoption of the teaching and learning methods that would provide the opportunity for:

- Self-development activities to gain skills such as being able to gather and process data (Sport Business Intelligence) or design the appropriate IT tools or design the Integrated Management Systems that would include the performance management systems (more practice and project-oriented subjects are required for this)
- Further strengthening of the teaching case studies in sport management education (Nova, 2013) as far as the teaching case studies describe problem situations occurring in the daily practice of sport organizations and the students are expected to assess the appropriateness or accuracy of the solution, which was adopted by the management of sports organizations or to propose, on the basis of information, the most appropriate solution / decision, even using theoretical concepts from management theory.
- Learning in teams to support critical and creative thinking in the area of organizational performance
- Full exploitation of the Cognitive Load Theory Model (Sweller, 1988; van Merriënboer & Sweller, 2005). This learning model is appropriate for the competency based curriculum as far as it uses the logic of the mind processes and stores information. But the model must be supplemented by good quality and quantity of study materials. Thus, the effectiveness of students learning can be achieved (Schilling, 2016).
- To achieve the interactive students' engagement behaviors using the ICAP framework that differentiates four modes of students learning modes: Interactive, Constructive, Active, and Passive – ICAP. This framework states that students' learning is increasing as they are more engaged with the learning materials and thus moving from passive to active, constructive and interactive behavior (Chi & Wylie, 2014).

All suggested changes that are supported by the latest theories in the active learning will allow the designing of a new, more focused approach to the teaching and learning of the relevant body of the knowledge to enhance the students' skills and capabilities for the appropriate implementation of the organizational performance models after completion of the sport management studies.

References

- Bayle, E. & Madella, A. (2002). Development of a Taxonomy of Performance for National Sport Organizations. *European Journal of Sport Science*, vol. 2, issue 2, 1-21.
- Bayle, E. & Robinson, L. (2007). A Framework for Understanding the Performance of National Governing Bodies of Sport. *European Sport Management Quarterly*, Vol. 7, No. 3, 249 – 268.
- Hoye, R., Nicholson, M., Smith, A., Stewart, B., & Westerbeek, H. (2012). *Sport Management: Principles and applications* (3rd ed.). Abingdon, United Kingdom: Routledge.
- Chappelet, J. & Bayle, E. (2005). *Strategic and Performance Management*, Champaign, IL: Human Kinetics
- Chi, M.T.H. & Wylie, R. (2014). The ICAP Framework: Linking Cognitive Engagement to Active Learning Outcomes. *Educational Psychologist*, 49(4), 219–243. DOI: 10.1080/00461520.2014.965823.
- Kaplan, R.E. - Norton, D.P. (1992). The Balanced Scorecard- Measures That Drive Performance. *Harvard Business Review*. January -February 1992, pp.71-79.
- Kaplan, R. S., & Norton, D. P. (1996). Using the balanced scorecard as a strategic management system. *Harvard Business Review*, 76, 75–85.
- Kirschner, P.A., Sweller J.& Clark, R.E. 2006). Why minimal guidance during instruction does not work: an analysis of the failure of constructivist ,discovery, problem-based, experiential, and inquiry-based teaching. *Educational Psychologist*. 41(2):75-86. doi:10.1207/s15326985ep4102_1.
- Van Merriënboer, J.J.G & Sweller, J. (2005) Cognitive load theory and complex learning: recent developments and future directions. *Educational Psychology Review*. 2005;17(2): 147-1 77. doi: 10.1007/s 10648-005-3951 -0.
- Neely, A., Adams, C., & Kennerley, M. (2002). *The Performance Prism*. Financial Times, UK: Prentice Hall
- Nová Jana (2013). The role of the teaching case studies in the sport management education. In Zuzana Sajdlová, Martin Zvonář. *Sport and Quality of Life 2013*. Brno: Masarykova univerzita, 2013, 319-328.
- Nová, J. (2014). The managerial concepts of the quality and performance and their integration in the sports organizations. *SPORT MONT*, 40–42(12), 73–80. Retrieved from http://www.sportmont.ucg.ac.me/download_pdf_arhiva.php/SM_40-41-42.pdf
- Nová, J. (2016). PRINCIPLES AND FUNCTIONS OF SPORT MANAGEMENT In : Nová, J., Novotný, J., Racek, O., Rektorič, J., Sekot, A., Strachová, M. & Válková, H. (2016). *Management, marketing a ekonomika sportu*. 1. vyd. Brno: Masarykova univerzita.

- O'Boyle, I. & Hassan, D. (2014). Performance management and measurement in national-level non-profit sport organisations. *European Sport Management Quarterly*, Vol. 14, No. 3, 299–314, <http://dx.doi.org/10.1080/16184742.2014.898677>
- O'Boyle, I. (2015). Developing a performance management framework for a national sport organization. *Sport Management Review* 18 (2015) 308–316.
- Robinson, L. (2012). The management and measurement of organizational performance. In: *Managing Sport Business. An Introduction*. Edited by Linda Trenberth and David Hassan. Routledge, pp.169- 184.
- Schilling, J.F. (2016). Cognitive Load Theory of Learning: Underpinnings and Model. *International Journal of Athletic Therapy*. Vol. 21 (2), 12-16, <http://dx.doi.org/10.1123/ijatt.2014-0074>.
- Strauss, A. & Corbin, J. (1998). *Basic of Qualitative Research. Techniques and Procedures for Developing Grounded Theory*. Sage Publications. Thousand Oaks. California.
- Sweller, J (1998). Cognitive load during problem solving: effects on learning. *Cognitive Science*. 1988; 12 (2):257-285. Doi :10.1207/s15516709cog1202_4.
- Wäsche, H. & Woll, A. (2013). Managing regional sports tourism networks: a network perspective. *European Sport Management Quarterly*, Vol. 13, No. 4, 404-427, <http://dx.doi.org/10.1080/16184742.2013.811608>.
- Winand, M. & Zintz, T. & Bayle, E. and Robinson, L. (2010). Organizational performance of Olympic sport governing bodies: dealing with measurement and priorities. *Managing Leisure* 15, 279- 307.
- Winand, M. Vos, S., Claessens, M., Thibaut, E. & Scheerder, J. (2014). A unified model of non-profit sport organizations performance: perspectives from the literature. *Managing Leisure*, 2014, Vol. 19, No. 2, 121–150, <http://dx.doi.org/10.1080/13606719.2013.859460>

Web resources:

- AFL Community Club Improvement Program. [On-line].Retrieved from: <http://www.aflcommunityclub.com.au/index.php?id=13>. [19.08.2018].
- SPARC-Sport And Recreation New Zealand: Improving how it measures its performance. [On-line].Retrieved from: <https://www.oag.govt.nz/2010/sparc/docs/sparc.pdf> . [19.08.2018].
- Performance measurement for the development of sport – A good practice guide for local authorities. (2001). Sport England. SE/2081A/P/10/01. . [On-line].Retrieved from: <http://www.toolkitsportdevelopment.org/html/resources/3F/3F087249-B1C6-4BFA-BB63-42DF308CAC30/best%20value%20through%20sport%20performance%20measurement.pdf>. [19.08.2018].

Study Programs And College Student Satisfaction: The Case Of Czech Students

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Abstract

Student satisfaction with their study programs is considered one of the most crucial factors that shape their experience within the higher education system. In this article, we address the following research question: How important are subject fields and academic features of study programs for college student satisfaction? For this purpose, we used data from a survey of college students (N = 1237) carried out in 2018 at Tomas Bata University in Zlín (Czech Republic), where a modified version of the Studiebarometeret (NOKUT) questionnaire was applied. The results are based on the 6-factor solution of CFA. Descriptive results of all study fields are compared. Although the overall differences in satisfaction are rather small, a cluster analysis shows that they are not based on different study fields but primarily on other academic characteristics of those study fields (size of study groups, level of study, and the ratio of applicants and admitted students).

Introduction

The Czech higher education system has been undergoing a complex transformation in recent years. Following the adoption of a new law in 2016, extensive measures for achieving the desired quality of educational processes and auditing services of universities have been implemented. It was due to beliefs that the quality of education, despite its problematic conceptualization (Green, 1994), is a crucial indicator of distinction in both the national and international higher education arena, i.e. something that several authors (Blackmore, 2009; Strathern, 2000; Muijs & Bokhove, 2017) critically see as a tool of accountability and marketing rather than means of enhancement of their practices and services.

In this regard, the Czech higher education system has been following a trend that started in the early 1990s in the Western countries and then has been continuing in Asia and East Europe countries (Douglas et al., 2006, 2015; Liu et al., 2017; Peter, 1997). Nowadays, it is part of a broader transformation of the higher education system in the Central Europe where a new “skill-production regime” is being slowly built (Hall & Soskice, 2001) with a higher level of accountability to the public.

A big part of these new measures within the Czech higher education system is connected with the implementation of different models of quality indicators and evaluation, especially the evaluation of students’ satisfaction with their study programs, teaching quality, counseling, and other forms of institutional support. In this context, students are seen as customers of the universities (Gruber et al., 2010; Finey & Finey, 2010; Jongbloed et al., 2008; Joseph et al., 2005) using various services and products that should satisfy their needs, while shaping their experience with the college studies. Probably the most crucial role in this process is played by various interactions between the customers (students) and the university staff – e.g. teachers, counselors, and other representatives of the university who may change the students’ satisfaction upwards or downwards (Bitner et al., 1994).

Subsequently, the data about students’ satisfaction serve as an essential tool for universities and their management, because it can be used for several purposes such as:

- (1) Building and developing strategies for improving the quality of education and related services (among others see Alvaréz et al., 2016; Burgess et al., 2018; Liu et al., 2017). As Liu et al. (2017) argue, it is a primary indicator of self-assessment at any university which can be used as building stone for a quality management of the institution.
- (2) Improving the marketing strategy with a focus on new applicants (Lin et al., 2017) and responsiveness to changing the marketplace. Identifying strong and weak sides of student satisfaction can help in modifying market tools – for example, what should be highlighted, and, on the other hand, what should be de-emphasized.
- (3) Increasing loyalty of the students, which leads to their continuing studies at a higher level, or their recommending the university to new applicants (Ali et al., 2016; Alves & Raposo, 2007; Green et al., 2015; Douglas et al., 2015; Lin et al., 2017).
- (4) Improving the education outcomes of the students. In the expert literature, we can find many works (Jemelske, 2009; Richardson, 2005; Mascarella & Terenzini, 2005) that highlight a strong relationship between students’ satisfaction and their learning outcomes.

Many Western countries, especially those that slowly started with “qualitative” reforms in the late 1990s, have their national student satisfaction surveys. Probably the most known is NSS (National Student Satisfaction Survey) from the UK that has been used as a source of student satisfaction data in numerous studies (Burgess et al., 2018; Callendar et al., 2014; Cheng & Marsh, 2010; Sabri, 2013; Yorke, et al. 2014). National scale surveys are also carried out in the USA (National Survey for Student Engagement), Australia (Australia's Course Experience Questionnaire), Japan (Japanese College Student Survey), or Norway (Studiebarometeret). In contrast to those countries, the Czech higher education system does not have a unified approach to studying and evaluating student satisfaction. There does not exist any standardized protocol or research tool used in the whole country. Every university is responsible for creating their own. For this reason, our presented data are the product of a survey carried out by one of the Czech state universities in the spring of 2018.

Research in the area of student satisfaction is extensive. It mainly focuses on different factors influencing student satisfaction: e.g. student employment status (Moro-Egido & Panedes, 2010), quality of assessment (Russell & Lehman, 2008), teaching quality and organization management (Burgess et al., 2018; Langan et al., 2013), college experience (Elliott & Healy, 2001), class size (Peterson et al., 2001), or a combination of several factors together (Tessema et al., 2012).

According to several studies (Audin et al., 2003; García-Aracil, 2009; Green et al., 2015; Lid et al., 2014; Radloff & Coates, 2010), subject fields are one of the most critical factors that make student satisfaction different. It is based on the assumption that students from various study fields have both different motivation to study and experience within the higher education system. According to some international studies (Lid et al., 2014; Radloff & Coates, 2010), we can find significant differences between social-science disciplines (e.g. psychology, social work), law and medicine on the one side, and other sciences (for example engineering), and education (e.g. pedagogy) on the other side. In the case of the latter, students are usually less satisfied with their studies and related services.

Purpose of the study

In this study, we follow the international research about the role of subject field in student satisfaction. We examine to what extent subject fields, as a curricular basis of the higher education in the Czech Republic, are essential factors influencing student satisfaction. In this regard, we address two fundamental research questions:

- (1) Do Czech college students significantly differ in their satisfaction according to their subject field?
- (2) Are there any commonalities between different subject fields according to a cluster analysis?

Methodology

For our survey we have decided to use a modified version of the Norwegian questionnaire known as Studiebarometeret which is a product of NOKUT (Norwegian Agency for Quality Assurance in Education) and was first implemented in 2013. We work with its English version from 2015. Our modification consists of two critical changes: the translation of the questionnaire into the Czech language and its transformation according to the educational context of the Czech Republic as well as our university. It meant a slight meaning modification of some items and also a partial modification of the factor structure (only some dimensions were used and one was added).

The research tool is still being modified (NOKUT, ©2017), so its internal structure has not been finalized yet. Some factors and items are stable while some were added or changed over time. As the structure is variable, we have decided to use a modified version. This solution is more suitable for an internal quality evaluation at our university. As the evaluation process at our university is based on more surveys among students, we have only chosen some dimensions from the Studiebarometeret which are suitable for a summative evaluation of our study programmes. As for other unapplied dimensions, we have not applied the Teaching and Counselling dimension as there is an individual survey considering only this parameter of quality evaluation at our university where students have an opportunity to assess each teacher in each subject after every semester. Instead, we added one dimension called International mobility (F5).

The next table (Table 1) presents all the factors (dimensions) and their items chosen to be applied in our survey. The numbers of factors are not connected to the original questionnaire but to our modified version.

Some other items of our questionnaire were also based on Studiebarometeret, but they were only used as single items for our internal evaluation. In this text, we only work with the 6-factor structure which was further reduced during the validation as shown below. We have also used a set of sorting variables (mainly the information connected to the faculties and fields of study).

Table 1: Factors and dimensions of the research tool

Factors	Items
F1 Learning outcomes	Theoretical knowledge
	Knowledge of scientific work methods and research
	Experience with research and development work
	Skills specific to the discipline and working life
	Critical thinking and reflection
	Cooperative skills
	Ability to work independently
	Oral communication skills
	Written communication skills
F2 Study environment	Innovative thinking
	Rooms for teaching and other study work
	Equipment and study tools
	Library and library services
F3 Working life relevance	ICT tools and services (e.g. teaching platforms, software and PC availability)
	Relevance to 'natural' occupational fields
	Relevance to good career opportunities
	The knowledge that is generally useful in occupational life
F4 Participation	Skills that are generally useful in occupational life
	The students' opportunity to influence the study programme content and design
	How students' viewpoints are taken into account and followed
F6 Stimulation and coherence	The local student democracy
	The programme is stimulating
	The programme is academically challenging
	The programme consists of courses that are well connected and integrated

Overall, 1,237 students took part in the survey. An online questionnaire was applied. The total response rate was 26 %. One student was excluded from the analysis due to his unclear study field affiliation.

As the first step of the validation, an exploratory factor analysis (EFA) was applied to see whether it is possible to work with the original (but slightly modified) structure of the questionnaire. As the result was very similar, we based our model of the confirmatory factor analysis (CFA) on its solution. However, we expected some reductions in the model, as CFA has much more stringent requirements from the statistical point of view. The final result (after a reduction of weak items) is presented in the following picture (Schema 1). The basic parameters are fulfilled (Chi-square = 530,259; Degrees of freedom = 137; CMIN/DF = 3.871; Probability level = 0.000; CFI = 0.955; TLI = 0.938; RMSEA = 0.048). Although some coefficients inside the structure are rather weak, we consider it a suitable model for our research.

The level of reliability is high (see Table 2), except for Factor F6 (0.599). One of the possible explanations could be its general and more abstract content in comparison to other factors. We consider Factor F6 the last and weakest one, and future applications of the questionnaire will show whether it should be discarded completely from the questionnaire structure.

Schema 1: Confirmatory factor analysis (the source: our own calculation)

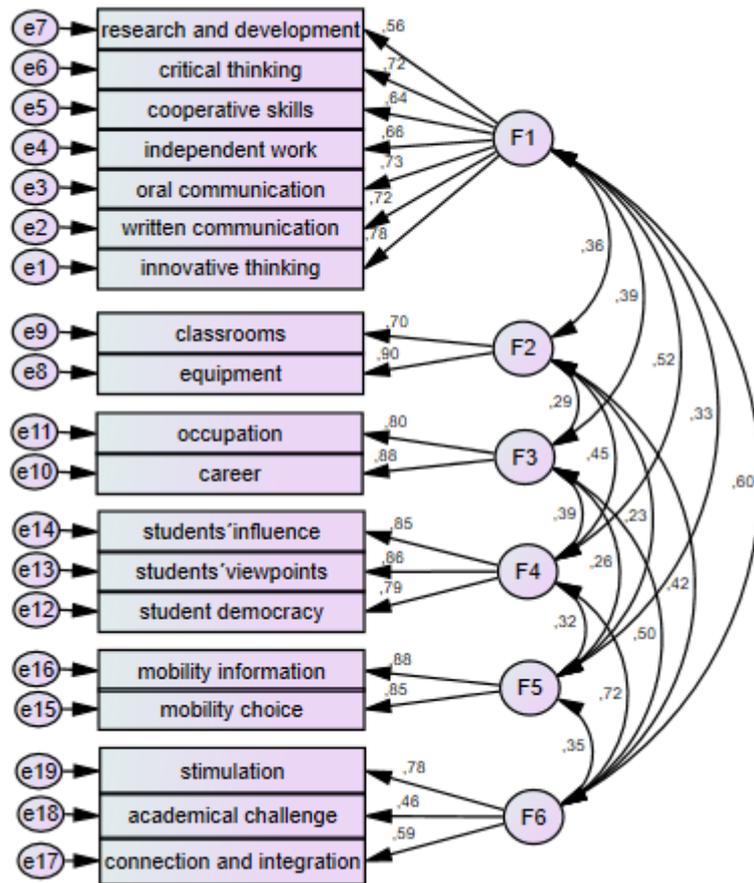


Table 2: Reliability of factors – Cronbach’s α (source: own calculation)

Factor	Description	Cronbach’s α
F1	Learning outcomes	0.860
F2	Study environment	0.777
F3	Working life relevance	0.806
F4	Participation	0.873
F5	International mobility	0.848
F6	Stimulation and coherence	0.599

Results

We present the descriptive results of our survey in three diverse but complementary forms. The first of them use the ISCED F (2013) classification of study fields (Table 3). The second one uses the same classification as was applied by Lid et al. (2014) in their survey through the NOKUT questionnaire (Table 4), and the third utilizes the structure of the study programs described in the García-Aracil (2009) study about the European graduates (Table 5). This strategy helps us show our descriptive results in different contexts using various procedures for the data aggregation – from the most detailed approach (the ISCED F classification used in Table 3) to the most general approach (Garcia-Aracil’s classification). It also helps us compare our results with findings from two international studies.

Descriptive results

If we look at differences in satisfaction according to different study fields, we can find that these differences are rather small. Students are satisfied slightly above average. The highest level of satisfaction (see Table 3) can be found in students of Fine Arts, Marketing and Advertising, Software and Applications Development, Engineering, and Education. Their average score is of 3.5 to 3.8 on a scale of 1 to 5. On the other hand, we identified the lowest level of satisfaction in the area of Audio-Visual Techniques and Media Production, Database and Network Design and Administration, and Caring for the Elderly and Disabled Adults. All of them have scored around 3.0. From these results it is evident that there are no clear thematic groups of subject fields (e.g. social sciences versus natural sciences) that influence student satisfaction.

Table 3: College student satisfaction according to different study fields – 23 study fields, ISCED F classification (the source: our own calculation)

Field of study	F1	F2	F3	F4	F5	F6	Total
Audio-visual techniques and media production	3.2	3.4	3.0	2.8	2.9	2.6	3.0
Database and network design and administration	3.2	3.5	3.1	2.8	3.0	3.0	3.1
Caring for the elderly and disabled adults	3.5	3.5	3.1	2.8	2.5	3.0	3.1
Training of pre-school teachers	3.5	3.4	3.3	2.5	3.0	3.3	3.2
Nursing and Midwifery	3.6	3.5	3.4	2.7	3.1	3.1	3.2
Management and administration	3.5	3.8	3.2	2.7	3.0	3.3	3.2
Accounting and taxation	3.5	3.5	3.4	2.7	3.0	3.3	3.2
Food processing	3.4	3.7	3.4	2.7	3.0	3.3	3.3
Protecting people and property	3.4	3.7	3.2	3.0	3.0	3.2	3.3
Economics	3.5	3.7	3.4	2.7	3.0	3.3	3.3
Finance, banking, and insurance	3.4	3.8	3.3	2.6	3.3	3.1	3.3
Art and humanities (interdisciplinary)	3.7	3.6	3.4	2.7	3.4	3.2	3.3
Environment	3.9	4.1	2.8	3.2	2.8	3.2	3.3
Fashion, interior, and industrial design	3.6	3.4	3.4	3.3	3.2	3.3	3.4
Technology and construction (interdisciplinary)	3.6	3.6	3.7	3.0	3.0	3.5	3.4
Chemical engineering and processes	3.4	4.0	3.6	2.8	3.4	3.1	3.4
Engineering and engineering trades	3.4	4.2	3.8	2.8	3.2	3.1	3.4
Education and training (interdisciplinary)	3.8	3.5	3.3	3.1	3.2	3.4	3.4
Education	4.0	3.8	3.4	3.2	3.1	3.3	3.5
Software and applications development and analysis	3.7	4.3	3.1	3.5	3.5	3.3	3.6
Teacher training with subject specialization	3.9	4.0	3.5	3.3	3.5	3.4	3.6
Marketing and advertising	4.0	4.0	3.6	3.4	3.3	3.4	3.6
Fine arts	4.0	4.0	3.6	4.2	3.7	3.6	3.8

When we take another step forward in our analysis and compare study fields according to the Lid et al. (2014) classification, differences are even smaller (see Table 4). Individual study fields differ by only 0.1 to 0.2 of scale points, the lowest score being for Nursing and Engineering, and the highest for Art, and Pedagogy. A comparison with the results of student overall satisfaction from Norway (see the last column of the Table 4) shows that students from the Nordic country are generally more satisfied than Czech students in our survey but there are no similarities with satisfaction according to study fields.

Table 4: College student satisfaction according to different study fields – seven study fields (the source: our own calculation and Lid et al., 2014)

Field of study	F1	F2	F3	F4	F5	F6	Total	Lid et al. (2014) results*
Nursing	3.6	3.5	3.2	2.7	2.9	3.1	3.2	4.1
Engineering	3.3	3.7	3.2	2.9	3.0	3.1	3.2	3.8**
Teacher education	3.6	3.5	3.3	2.6	3.0	3.3	3.2	3.7
Business and administration	3.6	3.7	3.4	2.8	3.1	3.3	3.3	4.2
Natural sciences	3.5	4.0	3.4	2.9	3.3	3.2	3.4	4.1
Art	3.6	3.5	3.4	3.4	3.3	3.3	3.4	4.0
Pedagogy	3.9	3.6	3.4	3.2	3.2	3.4	3.4	4.0

Note: *Results of overall satisfaction for all students from the particular study fields in Norway. **Data for Engineering at the bachelor level.

In the last step of our descriptive analysis we analyzed study fields classified only into six categories. Not surprisingly, also in this case, the differences were minimal – 0.1 to 0.2 of scale points (see Table 5). We did not

find any relevant commonalities between study satisfaction and study fields in our survey and the data from the García-Aracil (2009) survey of the European graduates (see especially the last two columns of Table 5).

Table 5: College student satisfaction according to different study fields – six study fields (the source: our own calculation and García-Aracil, 2009).

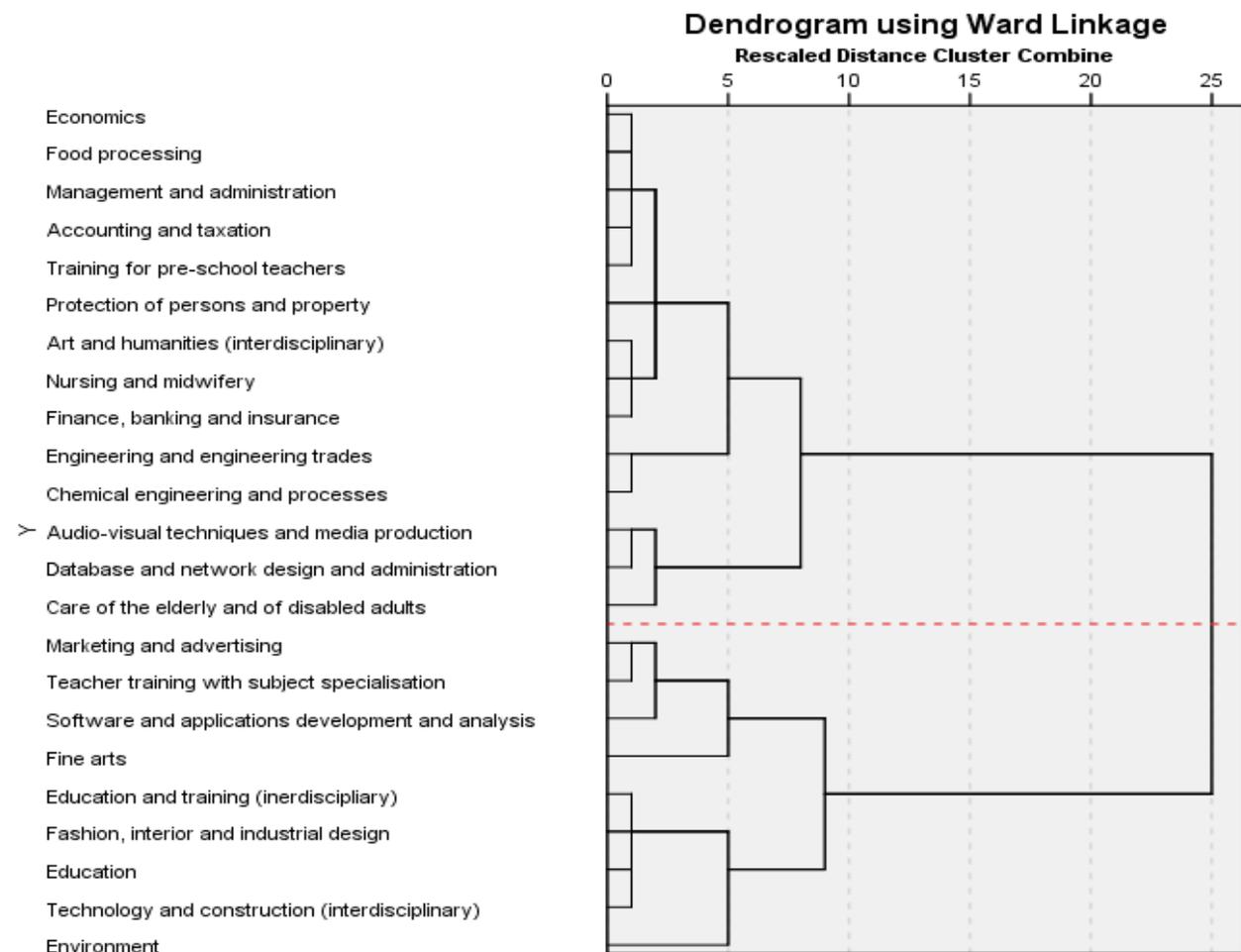
Field of study	F1	F2	F3	F4	F5	F6	Total	Czech*	Europe**
Medical sciences	3.6	3.5	3.2	2.7	2.9	3.1	3.2	3.0	3.8
Engineering	3.3	3.7	3.2	2.9	3.0	3.2	3.2	3.7	3.8
Social sciences	3.7	3.8	3.4	2.9	3.1	3.3	3.3	4.0	3.8
Humanities	3.6	3.5	3.4	3.1	3.3	3.2	3.4	3.6	3.7
Education	3.8	3.6	3.3	3.0	3.1	3.4	3.4	3.3	3.7
Natural sciences	3.6	4.0	3.4	2.9	3.3	3.1	3.4	3.5	3.6

Note: *Results of overall satisfaction of graduates from the particular study fields in the Czech Republic from the García-Aracil (2009) study. ** Results of overall satisfaction of graduates from the particular study fields in Europe (11 European states together) from the García-Aracil (2009) study.

Analytic results

For a more detailed analysis of our data we used a cluster analysis based on the 6-factor structure of the questionnaire. The Dendrogram created by the Ward Linkage method helped us identify fields of study with similar results. The closer the linkage on the standardized scale (0-25) between two fields is, the more similar their assessment in the 6-factors of the questionnaire is.

Schema 2: Cluster analysis (the source: our own calculation)



From the Dendrogram (Schema 2) we can see that two primary groups of study fields can be defined (shown by the dashed line). Although we could consider other solutions with more clusters, we preferred simplicity, which enables a more precise interpretation. The first cluster includes 14 study fields (using the ISCED F classification)

with 829 students (67 %), and the second one includes nine study fields with 407 students (33 %). When we compare the results of the two clusters and add other information about the study fields (academic features of the study programs), the results show that the satisfaction is higher in all 6-factors, except for Factor F2. In addition, in the second cluster there is a much higher percentage of students attending small study groups of the bachelor study programmes where less than 40 % of applicants were admitted to the study (see Table 6).

Most significant differences between these two clusters lie in the evaluation of learning outcomes (Factor F1). More satisfied students score higher in the evaluation of their learning process. They are also significantly more satisfied with the possibilities of participating in their learning process (Factor 4) – how they can influence the study program content, or how academic staff work with their comments and remarks. In other factors, differences are smaller.

Table 6: Differences between less satisfied and more satisfied students (the source: our own calculation)

		Ward Method	
		Cluster 1 Less satisfied	Cluster 2 More satisfied
Overall results in 6 factors of the questionnaire (mean)			
Factors	F1: Learning outcomes	3.4	3.9
	F2: Study environment	3.7	3.7
	F3: Working life relevance	3.3	3.4
	F4: Participation	2.7	3.3
	F5: International mobility	3.1	3.2
	F6: Stimulation and coherence	3.2	3.4
Complementary information about study fields (column %)			
Size of study groups	Size of study groups ≤ 20 students	7%	41%
	Size of study groups 21 - 50 students	62%	26%
	Size of study groups > 50 students	31%	33%
Level of study	Bachelor study programme	52%	67%
	Master study programme	46%	32%
	Doctoral study programme	2%	1%
Ratio of applicants	The ratio of applicants and admitted students > 60%	59%	46%
	The ratio of applicants and admitted students 41 - 60%	40%	14%
	The ratio of applicants and admitted students ≤ 40%	1%	40%

Discussion

This research aimed at getting to understand the complex relationship between student satisfaction and study fields, the latter being considered an important factor influencing college student experience (Audin et al., 2003; García-Aracil, 2009; Green et al., 2015; Lid et al., 2014; Radloff & Coates, 2010). Contrary to previous studies we did not find any significant differences in student satisfaction according to their study fields. Only on the level of the ISCED F classification we identified relevant differences between some study fields but without any thematic familiarity (see Table 3). This conclusion is also relevant for analytical results that did not show any thematic similarity between study fields based on the cluster analysis. In order to answer the first one of our research questions (Do Czech college students significantly differ in their satisfaction according to their subject field?) we can conclude that college students in our sample do not significantly differ in their satisfaction according to subject fields.

One of the possible reasons for this result lies in the limitation of our survey to only one university which does not work with a much more bigger and representative sample as the research done by García-Aracil (2009) or Lid et al. (2014). This is probably the reason why García-Aracil (2009, p. 14) identified as the negative influence the study fields of Education, Humanities, Engineering, and Medical Sciences in students satisfaction, while we did not find such a strong and clear relationship.

Based on our findings from the cluster analysis, we can say that commonalities between different subject fields exist (the research question no. 2). We identified two clusters of study fields that are significantly different, but we should highlight that this difference is the output of academic characteristic of these programs rather than their curricula or thematic orientations. The crucial factor in this distinction is the following three characteristics of study programs: (1) size of study groups (higher level of satisfaction can be expected in small study groups); (2) level of study (higher level of satisfaction seems to be connected with lower level of study); (3) ratio of applicants and admitted students (higher level of satisfaction is found in programs with lower ratio of applicants and admitted students).

These findings are partially novel in the context of international research focused on the link between student satisfaction and features of study programs, mainly in the focus on the ratio of applicants and admitted students that is not well researched. In the case of the study group size, we corroborate findings from the previous literature (Peterson et al., 2001) that consider the importance of smaller study groups for student satisfaction. On the other hand, we diverge from other studies (García-Aracil, 2009; Tessema et al., 2012) in the study level. According to them, students of higher level of study tend to express greater satisfaction. We identified an opposite trend.

Although these findings have some substantial limits for the understanding of college students' satisfaction (of their representatives, in particular), they are crucial evidence for the university management. They can be utilized for improving the study programs structure and offer. For this purpose, we can suggest two complementary strategies. One focused on "strong" study programs with a higher level of satisfaction (Cluster 2), and the other focused on "weak" study programs (Cluster 1).

The first strategy should focus on improving some evaluated factors in the study programs from Cluster 2 which have a similar score as the study programs in Cluster 1. Namely, these are Factor F3 – Working life relevance, and Factor F5 – International mobility. We suppose that an improvement in these two areas which are not directly connected with academic features of the study programs can change student satisfaction upwards.

The second strategy should focus on changing the design of the study programs in Cluster 1 in order to improve student satisfaction: (1) to lower the number of students in study groups to increase personal interaction between teachers and students; (2) to gain feedback from older students (students of the higher level of study) telling why their satisfaction during studies declined, and then to propose remedies; (3) to lower the ratio between applicants and admitted students, and accordingly, to improve and personalize the marketing of study programs toward students that are highly motivated for enrolling in particular study programs. Most of these measures are in line with the recommendations from the international literature (Ali et al., 2016; Lin et al., 2017).

References

- Ali, F., Zhou, Y., Hussain, K., Nair, P. K., & Ragavan, N. A. (2016). Does higher education service quality effect student satisfaction, image and loyalty? A study of international students in Malaysian public universities. *Quality Assurance in Education*, 24(1), 70–94.
- Alves, H., & Raposo, M. (2007). Conceptual model of student satisfaction in higher education. *Total Quality Management*, 18(5), 571–588.
- Álvarez R. V., Freira D., Vernazza, E., & Alves, H. (2016). Can students' satisfaction indexes be applied the same way in different countries? *International Review of Public Nonprofit Market*, 13(1), 101–118. DOI: 10.1007/s12208-016-0155-x
- Audin, K., Davy, J., & Barkham, M. (2003). University quality of life and learning (UNIQLL): An approach to student well-being, satisfaction and institutional change. *Journal of Further and Higher Education*, 27(4), 365–382.
- Bitner, M. J., Booms, B. H., & Mohr, L. A. (1994). Critical service encounters: The employee's viewpoint. *Journal of Marketing*, 58(1), 95–106.
- Blackmore, J. (2009) Academic pedagogies, quality logics and performative universities: evaluating teaching and what students want. *Studies in Higher Education*, 34(8), 857–872, DOI:10.1080/03075070902898664
- Burgess A., Senior C., & Moores, E (2018), A 10-year case study on the changing determinants of university student satisfaction in the UK. *PLoS ONE* 13(2), e0192976. DOI:10.1371/journal.pone.0192976
- Douglas, J., Douglas, A., & Barends, B. (2006). Measuring student satisfaction at a UK university. *Quality Assurance in Education*, 14(3), 251–267.
- Douglas, J. A., Douglas, A., McClelland, R., & Davies, J. (2014). Understanding student satisfaction and dissatisfaction: An interpretative study in the UK higher education context. *Studies in Higher Education*, 39(1), 251–267.
- Callendar C., Ramsden P. & Griggs J. (2014) *Review of the National Student Survey: HEFCE*. Available at: <http://www.hefce.ac.uk/pubs/rereports/year/2014/nssreview/>.

- Cheng J. H. S. & Marsh, H. W. (2010). National Student Survey: are differences between universities and courses reliable and meaningful? *Oxford Review of Education*, 36(6), 693–712. DOI:10.1080/03054985.2010.491179
- Elliott, K. M. & Healy, M. A. (2001) Key factors influencing student satisfaction related to recruitment and retention. *Journal of Marketing for Higher Education*, 10(1), 1–11.
- Finney, T. G. & Finney, R. Z. (2010). Are students their universities' customers? An exploratory study. *Education + Training*, 52(4), 276–291
- García-Aracil, A. (2009). European graduates' level of satisfaction with higher education. *Higher Education*, 57(1), 1–21.
- Green D. (1994). *What Is Quality in Higher Education?* Bristol, UK: Taylor & Francis.
- Green, H. J., Hood, M., & Neumann, D. L. (2015). Predictors of Student Satisfaction with University Psychology Courses: A Review. *Psychology Learning & Teaching*, 14(2), 131–146. DOI:10.1177/1475725715590959
- Gruber, T., Fuß, S., Vosss, R., Zikuda, M. G. (2010). Examining student satisfaction with higher education services: Using a new measurement tool. *International Journal of Public Sector Management*, 23(2), 105–123.
- Hall P. A., Soskice D. (2001). *Varieties of Capitalism: The Institutional Foundations of Comparative Advantage*. Oxford University Press.
- ISCED Fields of education and training 2013 (ISCED-F 2013). Available at: <https://ege.ge/res/docs/228085e.pdf>
- Jemelske, E. (2009). Measuring the impact of a university first-year experience program on student GPA and retention. *Higher Education*, 57(3), 373–391.
- Jongbloed, B., Enders, J., & Salerno, C. (2008). Higher education and its communities: interconnections, interdependencies and a research agenda. *Higher Education*, 56(3), 303–324.
- Joseph, M., Yakhou, M., & Stone, G. (2005). An educational institution's quest for service quality: customers' perspective. *Quality Assurance in Education*, 13(1), 66–82.
- Lin, K-J., Chen, H-M., Chen, H-M., & Chang, Y-S. (2017). The effect of TQM strategy on learning satisfaction and loyalty of students - the mediation effect of teaching quality. *World Transactions on Engineering and Technology Education*, 15(1), 49–56.
- Langan M. A, Dunleavy P. & Fielding, A. (2013) Applying Models to National Surveys of Undergraduate Science Students: What Affects Ratings of Satisfaction? *Educational Science* 3(2). DOI:10.3390/educsci3020193.
- Lid, S. E.; Bakken, P.; Kantardijev, K. (2014). *Student views on quality in their study programs – what matters?* Trondheim: NOKUT. Available at: https://www.nokut.no/globalassets/studiebarometeret/2014/stein-erik-lid_student-views-on-quality-in-their-study-programs---what-matters.pdf
- Liu L., Wang Y-S, Wu, T-J. (2017). Student Satisfaction Scale Development and Application for Sport Management in China. *Euroasia Journal of Mathematics Science and Technology Education*, 13(5), 1429–1444. DOI: 10.12973/eurasia.2017.00678a.
- Moro-Egido, A. I. & Panades, J. (2010) An Analysis of Student Satisfaction: Full-Time vs. Part-Time Students. *Social Indicators Research*, 96(2), 363–378.
- NOKUT. (2017). Previous questionnaires. Available at: <https://www.nokut.no/en/studiebarometeret/previous-questionnaires/>
- Muijs, D. & Bokhove, Ch. (2017). Postgraduate student satisfaction: A multilevel analysis of PTES data. *British Educational Research Journal*, 43 (5), 904–930. DOI: 10.1002/berj.3294
- Pascarella, E. T. & Terenzini, P. T. (2005). *How college affects students: A third decade of research*. San Francisco: John Wiley & Sons.
- Peter, A. M. (1997). Quality in European higher education: recent trend and their historical roots. *European Journal of Education*, 32(2), 111–127.
- Peterson, M., Wagner, J. A., & Lamb, C. W. (2001). The role of advising in non returning students' perception of their university. *Journal of Marketing for Higher Education*, 10(3), 274–282.
- Radloff, A., & Coates, H. (2010). *Doing more for learning: Enhancing engagement and outcomes. Australasian Survey of Student Engagement: Australasian Student Engagement Report*. Camberwell, Australia: Australian Council for Educational Research (ACER).
- Richardson, J. T. (2005) Instruments for obtaining student feedback: A review of literature. *Assessment and Evaluation in Higher Education*, 30(4), 387–415.
- Rusell, M. & Lehman, A. (2008) Predicting Student Satisfaction with Academic Advising. *The Mentor: An Academic Advising Journal*, 10(1). Available at: <https://dus.psu.edu/mentor/old/articles/080813mr.htm>
- Sabri D. (2010). Student Evaluations of Teaching as 'Fact-Totems': The Case of the UK National Student Survey. *Sociological Research Online* 18,(4) 15. DOI:10.5153/sro.3136
- Strathern, M., ed. 2000. *Audit cultures: Anthropological studies in accountability, ethics and the academic*. London and New York: Routledge.

- Tessema, M. T., Ready, K. & Yu, W-C. W. (2012). Factors Affecting College Students' Satisfaction with Major Curriculum: Evidence form Nine Years of Data. *International Journal oh Humanities and Social Science* 2, (2), 34-44.
- Yorke M., Orr S. & Blair, B. (2014). Hit by a perfect storm? Art & Design in the National Student Survey. *Studies in Higher Education*. 39,(10), 178-810. DOI:10.1080/03075079.2013.806465

Teacher Professional Development Strategies Of General Buddhist School

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Abstract

The objectives of this study were to propose strategies for development of teacher professional of general Buddhist schools and to study teacher professional development strategies. This study used mixed methods research consisting of 2 phases. Phase 1: The study of current conditions and desirable to determine the requirements needed for development of teacher professional used questionnaire for 354 teachers general Buddhist schools. Phase 2: The qualitative study focus group discussion with 15 experts with general Buddhist schools, analyzing the contents according to the objectives of the study.

The results :The Need Assessment of teachers professional development descending order was: Collaborative networks of forces (PNImodified = 0.16), Supportive Structures and Environment (PNImodified = 0.15) Individual Teacher Need (PNImodified = 0.14), Acting under Professional standards (PNImodified = 0.13), Learning of students and teachers (PNImodified = 0.13) and Following the Acting under KulayanamitDhamma. (PNImodified = 0.10). Teacher professional development strategies suitable and useful for general Buddhist schools consisted of 4 goals ,6 strategies, 9 Measure and 36 indicators .

Key Words: *Strategies ,teacher professional development*

Introduction

The quality of the education system depends on the quality of teachers. Because the quality of teachers is the most important factor for the quality of student learning. (OECD, 2013) The education systems of the countries getting high marks often give first priority to teachers through the selection of appropriate quality teachers or teacher quality. That is having the best person to be a teacher, keeping good teachers and taking the best out of teachers. (McKinsey Report, 2007) As the quality of teachers is critical to improving the quality of education because teacher quality affects student quality. Teachers have an important role in the development of a complete human being for all physical, mental and moral, ethics and culture to live with others happily. The quality of teachers is the key factor affecting the learning of the students. For there were research findings from various periods that students who had a good teacher develop 3 times advanced students to teachers is not good. And from the collection of relevant data analyzed, synthesized, and classified related to teacher development, including the teaching of teachers, ethics of teachers, the use of information technology (ICT) for teaching, new knowledge for teachers in the 21st century, the media and the teaching of teachers and problems of teacher development. The study found that driving to develop teachers lacks of mechanisms for collaboration to drive professional development of teachers to be a noble profession and the curriculum and teacher development are not consistent with the needs of teachers. (Office of the Education Council, 2013)

General Buddhist schools, Department of Education Buddhist Studies, Division Office of National Buddhism organize 409 lower secondary schools and upper secondary schools with 4,411 teachers. Having teachers recruited to teach is the duty, authority and responsibility of each school. The results of the 2nd round external assessment of 391 general Buddhist schools nationwide shows that only 209 schools or 53.45 % accredited quality standard, while 182 schools or 46.55 % have not certified. Considering the average standard of each standard, it revealed that 5th Standard: Students with the knowledge and skills required by the curriculum, has the lowest average (2.12). The next is 9th Standard: Teachers are capable of teaching effectively and focus on the learners, (2.45). This is consistent with the analysis of the potential for development of the general Buddhist schools, finding the weaknesses is that teachers lack of security and advancement of the profession. Teachers have not been developed to be able to organize the teaching and learning process that emphasizes learner-centered equitably and appropriately. Changes cause a brain drain to other organizes having more security. And management and staff development are not systematic. (Division of Buddhist Studies, 2010).

From the background and the importance above, the researchers are interested to study the needs for teacher professional development in general Buddhist schools to develop teachers on knowledge and skills to

meet the required performance. And to improve the working methods of teachers to effectively develop their productive stage as a professional teacher. This will affect the quality of education to students.

Objectives Of The Study

were to assess the needs for development of teacher professional of general Buddhist schools and to study teacher professional development strategies.

Definition

1. Strategy refers to the management or way of working at General Buddhist School. The general education is used as a tool for the development of professional quality teachers. Thus, Individual Teacher Needs Student and Teacher Learning Collaborative networks of forces Supportive Structures and Environment Acting under Professional standards and Acting under Kulayanamit Dhamma Achieve effective with 4goals are :

1.1 Goal means The overall goal of the strategy is to anticipate the importance of professional development.

1.2 Strategies means The Management Approach at General Buddhist School has chosen to work to achieve

the objectives set out.

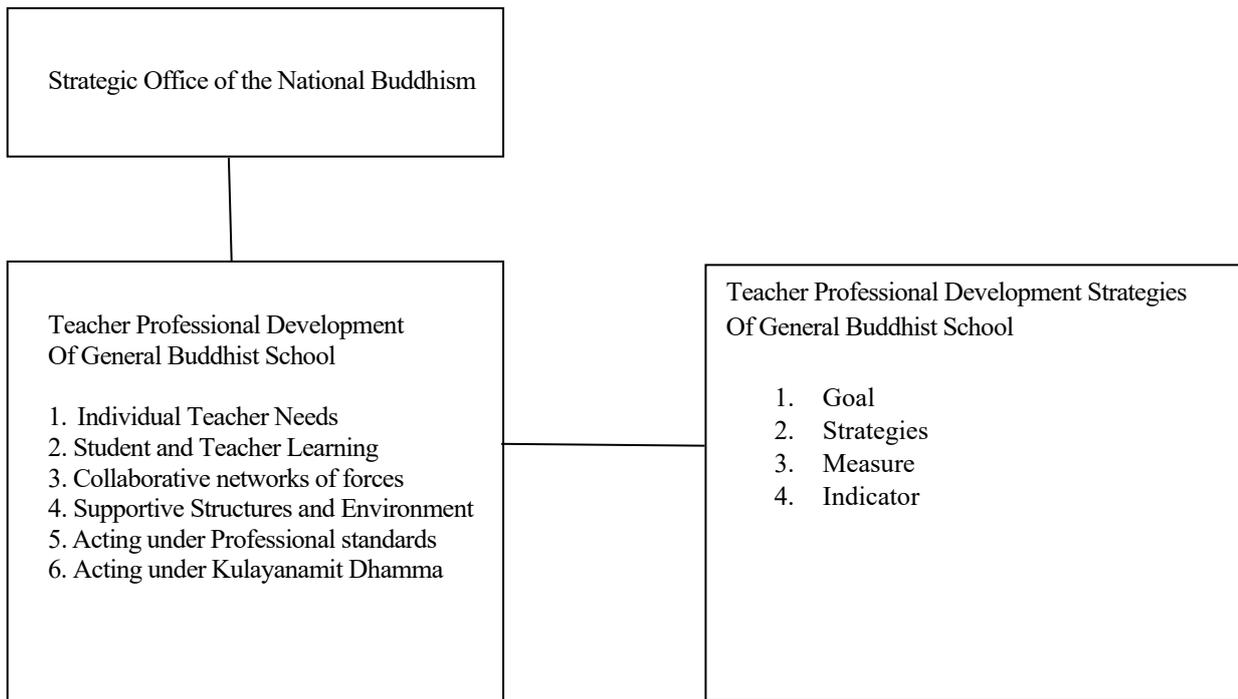
1.3 Measure means The program is based on a professional development strategy used by the teacher.

Each strategy succeeds.

1.4 Indicator means Identify or reflect on accomplishing goals.

2. General Buddhist School means Schools that provide basic education under the Ministry of Education To the novice monk.

conceptual framework



Population and sample

Phase 1 : The population in this study were 4,411 teachers in general Buddhist schools all over the country.

The target group was 354 teachers in general Buddhist schools randomized by the multi-stage random.

The sample size is determined by the square of Krejcie & Morgan,1970.

Phase 2 : The qualitative study focus group discussion with 15 experts

Methodology

This study used mixed methods research consisting of 2 phases.

Phase 1 : The study of current conditions and desirable to determine the requirements needed for development of teacher professional used questionnaire for 354 teachers general Buddhist schools.

Phase 2 : The qualitative study focus group discussion with 15 experts with general Buddhist schools, analyzing the contents according.

The Findings

1. Results of the study of the current conditions and desirable conditions and assess the needs for development of Teacher Professional Development of General Buddhist Schools are as follow :

No	TEACHER PROFESSIONAL DEVELOPMENT OF GENERAL BUDDHIST SCHOOLS	Current conditions		Desirable conditions		PNI _{modified}	Levels
		\bar{x}	S.D.	\bar{x}	S.D.		
1.	Collaborative networks of forces	3.37	1.01	3.90	0.89	0.16	1
2.	Supportive Structures and Environment	3.44	1.02	3.95	0.88	0.15	2
3.	Individual Teacher Need	3.48	1.00	3.96	0.91	0.14	3
4.	Acting under Professional standards	3.60	0.96	4.09	0.84	0.13	4
5.	Learning of students and teachers	3.50	0.96	3.96	0.91	0.13	5
6.	Acting under Kulayanamit Dhamma	3.89	0.90	4.27	0.81	0.10	6
	Totals	3.560	0.975	4.022	0.873	0.135	

2) Teacher professional development strategies suitable and useful for general Buddhist schools consisted of 4 goals were : 1) Promote the creation of a collaborative network of teachers of the Buddhist Scripture School. Department of General Education 2) Develop a structure and environment that supports professional development. 3) Promote the development of professional teachers to meet the needs of each teacher. 4) Promote and develop teachers to practice their professional standards.

- 6 strategies were : 1) Build collaborative networks of forces 2) Organize the structure and environment supporting professional development 3) Create a professional development system to meet the need of each teacher 4) Implement measures to promote compliance with professional standards 5) Encourage the Development of student and teacher learning 6) Promote the practice of moral principles , and 9 Measures 36 indicators.

The Discussion

Phase 1: The study of current conditions and desirable to determine the requirements needed for development of teacher professional found The Need Assessment of teachers professional development descending order was: Collaborative networks of forces because Educational Professional Network is a good example. Pay attention to personnel. And have ongoing operations Believe that learners are valuable and develop. Collaboration of school administrators, voluntary administrators These can be described as beliefs and good standing in the development of professional education networks. And when it is done, it results in the development of a professional education network well and with clear guidelines. Should be expanded. May be prepared as a plan. In addition, there is a need to improve the quality of education in order to improve teachers' professional qualities. Consistent with Thompson Gregg and Niska (2004) Community Network of Professional Learning is a combination. Sharing the power of sharing and learning with teachers, administrators and educators. Based on a culture of friendship, vision, values, goals, and common missions. Working together as a team to learn continuously in the way of working and living together. There are teachers together as leaders. And the management is supporting the learning and development of professional quality change. The quality of learning management emphasizes the success or effectiveness of learners. Of the members of the network.

Phase 2: Teacher professional development strategies suitable and useful for general Buddhist schools consisted of 4 goals were : 1) Promote the creation of a collaborative network of teachers of the Buddhist Scripture School. Department of General Education 2) Develop a structure and environment that supports professional development. 3) Promote the development of professional teachers to meet the needs of each teacher. 4) Promote and develop teachers to practice their professional standards. and 6 strategies were : 1) Build collaborative networks of forces 2) Organize the structure and environment supporting professional development 3) Create a professional development system to meet the need of each teacher 4) Implement measures to promote compliance with professional standards 5) Encourage the Development of student and teacher learning 6) Promote the practice of moral principles , and 11 Measure 36 indicators. because Strategy is the management approach that the organization chooses to implement. In order to achieve the goals set in the future. Strategies are the framework and guidelines that will allow executives to define plans and projects in

detail about what to do, how to go about a product that corresponds to the mission and goals of the organization. Consistent with Somjed Srisomjak (2016) Strategies for teacher development and educational personnel include 4 strategies, 9 Measure and 11 indicators.

Suggestion For Future Research

General Buddhist schools should do Research and Development to obtain an application form or programs in teacher professional development.

References

- Eleonora, M. (2003). *The Objects of Social Science*. London: Continuum Press.
- Division of Buddhist Studies, (2010). **Strategic Plan and Action Plan for Educational Development Department of General Education. (2010 - 2019)**. Bangkok : National Buddhist Printing Office.
- Krejcie, R.V., & Morgan, D.W. (1970). **Determining sample size for research**. In *Journal of Educational and Psychological Measurement*, 30(3), 607-610.
- McKinsey & Company. (2007). **How The World's Best Performing School Systems Come on Top**, (Online), Available: http://mckinseysociety.com/downloads/reports/Education/Worlds_School_Systems_Final.pdf, Retrieved March 11, 2016. From <http://pisathailand.ipst.ac.th/issue-2016-5>
- OECD. (2013). **PISA 2012 Results: What Makes Schools Successful? Resources, Policies and Practices, PISA, OECD Publishing**. From <http://pisathailand.ipst.ac.th/issue-2016-5>
- Office of the Education Council. (2013). **Analysis of status of teacher development system and Suggestions to improve teacher for student quality**. Bangkok: Phrigwan Graffic Limited.
- Somjed Srisomjak (2016). **Strategies for quality schools under the office of secondary educational service area 20**. Thesis submitted in partial fulfillment of the requirements for the degree of doctor of philosophy. Khon Kean University.
- Suwimon Wongwanitch, (2007). **Needs assessment research (Edition 2)**. Bangkok : Tummada place.
- Thompson, S.C. ; Gregg, L.; & Niska, J.M. (2004). **Professional Learning Communities, Leadership, and Student Learning**. *RMLE Online*. 28(1) : 1-15. <http://dx.doi.org/10.1080/19404476.2004.11658173>

Teachers' Opinions Related to Values Education in Gifted-Talented Students

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Abstract

In this survey, it is aimed to determine opinions of teachers about values education. The investigation is a case study one of the qualitative research models in the direction of the projection of the examination. Study group of the investigation consists of 10 teachers working in a science and art centre in the province of Aksaray. Interview form prepared by the researcher was utilized as a data collecting tool. Analysis of the collected data was performed by the use of descriptive analysis method. According to the result of the survey, it is inferred that the teachers reach the information about values education on their own meaning. The question that which values should be acquired by the students was replied as love, respect, fairness, helpfulness and honesty. What is more, the teachers suggest long term social responsibility about values education. The question that which teaching method, techniques, equipment and materials should be utilized shows that the teachers do not have enough knowledge. In this context according to the result of the survey it can be suggested that the teachers can be informed about the teaching methods, techniques, equipment and materials related to the values education and rearrangements can be applied in the current curriculum.

Key Words: *Gifted-Talented Students, Values Education, Teacher Opinions.*

Introduction

Through the centuries, the education changing the society has been changed with the society as well (Ogelman & Sarıkaya, 2015). For instance, technological developments has brought about the social problems as "value crisis". Therefore it is inevitable that the new necessities of the changing society now has new values (Yığıttir & Öcal, 2011). In other words, the renewing value concept has a very essential position in education. Since the time of Plato, Aristo and the following years, according to many philosophies and their works, the studies about values and its education and how to inherit the values from generation to generation have always been in the essential subjects. (Kenan, 2009). The values education remarks were concurred in the time of Socrates as well. (Ogelman & Sarıkaya, 2015). Socrates is the first westerner educationalist who is into teaching the children to be a good human in the Ancient Greek (Nash, 1997). Basic values like moral, responsibility, respect, fair and sensitiveness can be transferred to the individuals of society and sustain the persistence of culture (Yazıcı, 2006).

Values education starts from the birth of a baby. In the following years, the values education at school should develop at the same direction so that the aimed value acquisitions can be achieved but the family and school values should not conflict each other. Which values the parents want their children to have, the society aim all the children to gain the same values of parents as well (Çengelci, Hancı, & Karaduman, 2013). Ryan and Bohlin (1999) made suggestions to parents in order to create a good character for their children in terms of values education: first of all be a good example for your children, do not carry this heavy burden on your own and ask for help, control what is in your heart and mind, be patient about the main rules and values to be learned, the child should know the reason of punishment when it is necessary, use a moral language in your conversations and do not reduce character education just to the words.

The school is a place where social and individual perceptions develop consonantly to each other (Dewey, 2008). Emotional gains like respect, tolerance, responsibility and helpful are aimed to teach children with cognitive acquisition at schools (Akbaş, 2008; Çengelci, Hancı, & Karaduman, 2013). In this context, the tasks of the school in the open and hidden curriculum are to have them gain values in directions of education aims, affect them positively in terms of personal structure and point of view themselves, promote their moral developments (Akbaş, 2007).

When it comes to the meaning of the word "value", it is possible to assess different definitions. Çelikkaya (1996) defined value as every kind of emotion, thought, behaviour, rule or dignity based on as social, humanistic, ideologist or divine that is accepted and sustained in a society, belief, ideology or people.

Tezcan (1974) defined the values as standards that appreciates all cultures and societies. The most essential social values are respect, love and responsibility. Some of the values which are valid all times and places are these; fair,

modesty, loyalty, peace, courage, faithfulness, friendship, mindfulness, empathy, reliability, tolerance, steady, cooperation, helpfulness, austerity, leadership, mercy, kindness, self-esteem, sharing, patience, loyalty, respect, love, responsibility, prudence, fidelity, beneficence, spirituality, consistency in conversation and behaviours (Aydm, 2010).

Respect to the developments has occurred since then, there has nearly never been any time that “self-control refreshment” has been needed to come true of values education away from all political conflicts and every culture and geography (Kenan, 2009). Finally, renewal of the present values education in the curriculum by analysing the results of the values education studies is essential in terms of future of education.

Method

This study is a case study of qualitative research designs. In this research, semi structured interview technique was utilized in this qualitative research method which is described as investigation process that is used in order to present the events and phenomenon in a real and natural way by the use of data collecting methods like observation, interview, document analysis (Yıldırım and Şimşek, 2008).

In this investigation, teachers’ opinions about values education are aimed to detect. In this context, the developed interview form was finally edited by expert views. There are six open ended questions in the interview form.

Study Group

The study group of the investigation was detected by the use of convenient sampling method. The researcher selects an assessable and close fact or phenomenon and performs it quickly and practically in this convenient sampling method (Yıldırım and Şimşek, 2008). In this examination, 10 teachers working in a science and art centre in the province of Aksaray consist of the study group by the use of convenient sampling method.

Data Collecting Tool

In this study, an interview form was performed so as to collect data. 6 open ended questions which present the research problem best by scanning the current literature were prepared and added to the interview form in the process of interview questions’ preparation. Open ended research questions provides the researcher to approach the phenomenon flexibly and in an open ended style (Yıldırım ve Şimşek, 2008).

The interviews were performed according to the teachers’ advisable working time and dates. The interviews were recorded by the use of voice record tool and then transcribed so as to prevent data loss. A written permission was received for voice record from the teachers.

Teachers replied the 6 questions that they faced in the interview and added their opinions about values education. The interview questions prepared as a data collection tool were presented in Table 1.

Table 1. *Interview Questions of Data Collection Tool*

1. Do you have any information about the values education applied in the National Education Institution? Was there any informing work, meeting or a seminar about this subject? How and where did you access the information about the values education?
2. Which values do you think to be acquired by the students in the scope of values education? Why?
3. Do you find the values education enough applied at schools? What are your suggestions about this subject?
4. Which teaching methods, techniques or equipment and materials can be utilized in values education? What are your suggestions about this subject?
5. What are your applications related to the values education? Would you explain please?
6. Do you have any problems in the application of values education? What are the problems? How can these problems be solved, what are your solution suggestions?

Data Analysis

The data gathered from the interviews were analysed by the use of descriptive analysis method. Descriptive analysis; descriptive analysis consists of four stages as creating a framework, processing the data thematic framework, describing the data and interpreting the data (Yıldırım ve Şimşek, 2008). A thematic framework was founded by the researcher for the data analysis. The data were coded by the researcher in this scope. Then the collected data were coded in common themes by comparing each other.

The data were coded in accordance of the investigation by scanning the scripts again and again gathered from the interviews, and the themes were created which explain the coded data. The collected data were organized in a table. The interviewed teachers coded were identified from Ö1 to Ö10. The teachers’ opinions were directly cited for the interpretation of the data collected.

Findings

In this section, the findings are presented as a result of the investigation. Teachers' opinions related to values education are demonstrated below in tables.

The information related to where and how the teachers reached the information about the values education applied in the National Education Institutes were presented in Table 2.

Table 2. The information related to where and how the teachers reached the information about the values education applied in the National Education Institutes

Theme (Categories)	Codes	n	%
The sources of the information about the values available values education	School (Ö1,Ö2)	2	20
	Internet (Ö3)	1	10
	Personal Means (Ö4,Ö5,Ö8,Ö9,Ö10)	5	50
	Seminar (Ö6,Ö7)	2	20

When the Table 2 is viewed, teachers' opinions about where and how the teachers reached the information about the values education program applied in National Education Institutes are seen as "personal means" with the percentage of %50. Other opinions of the teachers are the school and seminar with %20 and internet with %10. The citations from the opinions of the teachers are given below.

"I had my first opinions with the help of bulletin boards and studies prepared at school. Then I read something about this subject" (Ö2)

"I have reached the information by the help of web site" (Ö3)

"I do not have much information. I have reached my available information as a result of investigations about the subjects." (Ö5)

"In the past it was mentioned a lot, meetings and seminars were applied in school level but I do not think it was effective" (Ö6)

Teachers' opinions about which values should be gained by students in the scope of values education are presented in Table 3.

Table 3. Teachers' opinions about which values should be gained by students in the scope of values education

Theme (Categories)	Codes	n	%
Which values should be gained by students	Love and Respect (Ö1,Ö7,Ö8)	3	30
	Family (Ö2)	1	10
	National and Religious Values (Ö3)	1	10
	Universal Values (Ö4,Ö5,Ö6)	3	30
	Social Ethics (Ö9,Ö10)	2	20

After viewing the Table 3, in terms of teachers' opinions about which values should be gained by the students, there are replies about a %30 ratio of universal (fair, patience, tolerance, helpfulness, honesty, merciful etc.) values and %30 ratio of love and respect values.

Among the other opinions, there are ratios of %20 social ethics, %10 family based values education and %10 national and religious values. The citations of teachers' opinions are demonstrated below.

"Respect... First of all, I think when there is respect somewhere, it is more likely to live in." (Ö1)

"I think the values education should start in the family. If there will be values education at school, this should be in an applicable way. Instead of just giving the students information about values education, we should work in with applicable works to go beyond this position." (Ö2)

“Individuals should be educated according to the national and religious values of this country” (Ö3)

“Fairness, patience, tolerance, helpfulness, human relations are to be performed in this context” (Ö4)

“Social ethics, good person, the rules for the daily life in society, human relations and communication.

As we live in a social environment, these properties are very essential to make this environment liveable to me.” (Ö9)

The third question -the teachers do not find the current values education applied at schools as a result of this- is about what can be done at school about this issue and about their suggestions are presented in Table 4.

Table 4. Teachers’ opinions about what should be done at schools about values education

Theme (Categories)	Codes	n	%
Teachers’ suggestions about values education	A specific lesson (Ö1)	1	10
	Long term social responsibility projects (Ö2,Ö3,Ö5,Ö6,Ö7,Ö8,Ö9)	7	70
	Model example (Ö4)	1	10
	Seminar for families (Ö10)	1	10

When Table 4 is viewed, teachers’ opinions about what should be done at schools about values education are mainly about the category of long term social responsibility projects with the ratio of %70. Other opinions of the teachers are a specific values education lesson with the ratio of %10, a model example for the children category with the ratio of %10 and family seminars with the ratio of %10. The citations of teachers’ opinions are demonstrated below.

“I don’t think it is enough. Because it is very difficult for teachers to spare time for the value education. May be it is very productive if there is a specific lesson named as values education.” (Ö1)

“It is not enough. It should be promoted by social activities.” (Ö2)

“It is not enough. There should be mostly applicable activities.” (Ö6)

“It is not enough. Teachers and students should apply the values mutually in daily life. Model examples should be constructed.” (Ö4)

“The application of the values are also very essential. It is not helpful at all not to obey them after spelling the values verbally. What is more, municipality organizations should give seminars to the families about the values education. Education starts in the family and continues in the society. If telling a lie, stealing or unchastity has become normal, they become normal in the family and society at last. In order to prevent these situations, the families should be honest and bad examples in TV series should be distracted. These behaviours should not drum into the brain and not be normal.” (Ö10)

Teachers’ opinions about the question related to values education which teaching methods and techniques or equipment and materials should be used are presented in Table 5.

Table 5. Teachers’ opinions about the question related to - values education which teaching methods and techniques or equipment and materials should be used.

Theme (Categories)	Codes	n	%
Which teaching methods and techniques should be used	Video (Ö1,Ö6)	2	20
	No idea (Ö2,Ö3,Ö5,Ö10)	4	40
	Everything (Ö4)	1	10
	Game, drama (Ö7)	1	10
	Application Activities (Ö8,Ö9)	2	20

Viewing the Table 5, it is found that teachers do not have any idea about which teaching methods, techniques and equipment and materials should be used at the ratio of %30. Other opinions are respectively videos at the ratio of

%20, application activities at the ratio of %20, and games at the ratio of %10. The citations of teachers' opinions are demonstrated below.

"Interactive flat board can be used. Films or videos can be watched about the values" (Ö1)

"I do not think that I have enough information to suggest any teaching methods, techniques, equipment or materials about this subject and I am not expert about it" (Ö2)

"It should be spontaneous. Every kind of facility can be used for this education, as long as teachers and parents are eager for it" (Ö4)

"Games." (Ö7)

"Instead of equipment and materials, application activities are more helpful" (Ö8)

Teachers' opinions about what kind of activities they apply in the scope of values education are presented in Table 6.

Table 6. Teachers' opinions about what kind of activities they apply in the scope of values education

Theme (Categories)	Codes	n	%
What kind of activities	Discussions (Ö1)	1	10
	MEB framework curriculum (Ö2)	1	10
	No answer (Ö3,Ö5,Ö10)	3	30
	Trips (Ö4,Ö7,Ö9)	3	30
	Direct instruction (Ö6,Ö8)	2	20

After viewing the Table 6, teachers' opinions about the applications related to values education are mostly trips with the ratio of %30 and no answer about the application related to the values education with the ratio of %30. Other opinions are respectively direct instruction with the ratio of %20, creating a proper discussion environment with the ratio of %10 and applying the framework curriculum of National Education with the ratio of %10.

"To be honest I cannot spare much time for it. When I have time in the classroom, I try to apply mutual discussions as it needs to be." (Ö1)

"I try to include values education into my lessons by the use of framework curriculum prepared by National Education" (Ö2)

"I include the activities in a verbal instruction" (Ö8)

"We go trips and visits about the subject" (Ö9)

Teachers' opinions about the problems encountered during the values education applications were presented in Table 7.

Table 7. Teachers' opinions about the problems encountered during the values education applications

Theme (Categories)	Codes	n	%
Encountered problems	Time (Ö1,Ö9)	2	20
	Lack of knowledge (Ö2)	1	10
	No idea (Ö3,Ö5,Ö8)	3	30
	Teacher's attitude (Ö4,Ö6)	2	20
	Value study (Ö7)	1	10
	Negative environment (Ö10)	1	10

After viewing the Table 7, teachers' opinions about the problems encountered during the values education applications are %30 no idea, %20 time problem, %30 teachers' different approaches to values education, %10 teachers' lack of knowledge, %10 value conflicts and %10 continuous negative effects on children of the environments. The citations of teachers' opinions are demonstrated below.

“There should be more investigations and studies about this subject. When you have a detailed information, it would be easy to apply it. I have observations about that teachers do not have enough information about this subject and they do not know how to manage the process of values education.” (Ö2)

“Everyone should give the same or similar attention to values education. When it is ignored, there will be no acquisitions for the students and teachers” (Ö4)

“Values studies.” (Ö7)

“Time problem is available. Assigning the students in the scope of social responsibility activities can be sometimes problematic.” (Ö9).

“...especially respect to woman should be acquired because the woman is an essential person who grows the child that is the base of the society and shapes the family.” (Ö10)

Result Discussion And Suggestions

This study is aimed to determine the opinions of teachers related to values education. According to the answers given in the current investigation, it is concluded that the teachers' knowledge about values education is gained by the help of their own means. The question that which values should be acquired by the students is replied by the teachers as love, respect, fairness, cooperation and honesty. What is more, the teachers suggest long term social responsibility projects to be organized related to values education subject. It is pointed out that the teachers do not have enough knowledge about what teaching methods, techniques, equipment or materials should be used in order to teach values education. According to the present examination, it can be understood that teachers generally instruct directly to teach values. The teachers build consensus about the problems encountered during values education applications. The idea of that the direct instruction method is not enough related to the problems during the applications and the presence of the teachers who has no idea about the issue come into prominence.

When it comes to the investigations performed about values education, Yiğittir and Öcal (2011) examined the opinions of 83 high school history teachers from different provinces in their study. According to their investigation, history teachers are eager to teach their students national values like “patriotism and love of nation, historical consciousness, sensitiveness to historical and cultural heritage, national and divine values, cooperation, respect, independence, respect to The Turkish National Anthem and Turkish flag”. The history teachers attended to the study are understood that they use different instructional methods to teach values education like inspiration, case study and book analysis, documentary and short films, trips to historical places and museums, biography examination, research, modelling.

In the study of Çengelci, Hancı and Karaduman (2013), they aimed to determine the opinions of teachers and students about values education in a primary school environment. Teachers proposed some suggestions related to teaching of values education process, school staff and school-family-society cooperation. Students think that mostly honesty value is tried to be instructed in their school. It is pointed out that students confirmed less the items about school cleaning and creating classroom rules. Ogelman and Sarıkaya (2015) aimed to show the opinions of pre-school teachers about the values education in their investigation. According to their study results, when it comes to values education, teachers firstly think the concepts like respect, love, tolerance, responsibility, cooperation, honesty, helpfulness and kindness. The problems encountered by the teachers during the values education are children's developmental situations (short attention span, lack of abstract thinking, readiness etc.), lack of support from families, lack of material, book, curriculum, teachers (self-esteem, lack of knowledge) and lack of time. Moreover, teachers claimed that it is necessary to inform families about the issue, include values education in preschool curriculum, promote teachers with materials about values education and give seminars to teachers.

Consequently, when the researches performed so far are examined in detail, all the surveys connect the same points. In this context according to the result of the current survey, it can be suggested that school staff and teachers are to be informed about teaching methods, techniques and materials to be used in values education and also rearrangements in the curriculum is to be applied.

References

- Akbaş, O. (2007). Türk Milli Eğitim sisteminin duyuşsal amaçlarının (değerlerinin) ilköğretim 8. sınıf öğrencilerinde gerçekleştirme derecesinin değerlendirilmesi. R. Kaymakcan, S. Kenan, H. Hökelekli, Ş. Arslan, & M. Zengin (Dü.), *Değerler ve Eğitimi Uluslararası Sempozyumu* içinde (s. 673-695). İstanbul: DEM Yayınları.
- Akbaş, O. (2008). Değer Eğitimi Akımlarına Genel Bir Bakış. *Değerler Eğitimi Dergisi*, 6(16), 9-27.
- Aydın, M. Z. (2010). Okulda Değerler Eğitimi. *Eğitime Bakış Eğitim-Öğretim ve Bilim Araştırma Dergisi*(18), 16-19.

- Çelikkaya, H. (1996). *Fonksiyonel Eğitim Sosyolojisi*. İstanbul: Alfa Yayınları.
- Çengelci, T., Hancı, B., & Karaduman, H. (2013, Haziran). Okul Ortamında Değerler Eğitimi Konusunda Öğretmen ve Öğrenci Görüşleri. *Değerler Eğitimi Dergisi*, 11(25), 33-56.
- Dewey, J. (2008). *Okul ve Toplum*. (H. A. Başman, Çev.) Ankara: Pegem Akademi.
- Kenan, S. (2009, Kış). Modern Eğitimde Kaybolan Nokta: Değerler Eğitimi. *Kuram ve Uygulamada Eğitim Bilimleri Dergisi*, 9(1), 259-295.
- Nash, R. (1997). Answering the "virtuecrats": a moral conversation in character education. New York: Teachers College Press.
- Ogelman, H. G., & Sarıkaya, H. E. (2015). Okul Öncesi Eğitimi Öğretmenlerinin Değerler Eğitimi Konusundaki Görüşleri: Denizli İli Örneği. *Sakarya Üniversitesi Eğitim Fakültesi Dergisi*(29), 81-100.
- Ryan, K., & Bohlin, K. (1999). *Building Character in Schools*. San Francisco: Jossey-Bass Publishers.
- Tezcan, M. (1974). *Türklerle İlgili Stereotipler (kalıp yargılar) ve Türk Değerleri Üzerine Bir Deneme*. Ankara: Ankara Üniversitesi Eğitim Fakültesi Yayınları.
- Yazıcı, K. (2006). Değerler Eğitimine Genel Bir Bakış. *Türklük Bilimi Araştırmaları Dergisi*, 499-522.
- Yiğittir, S., & Öcal, A. (2011). Lise Tarih Öğretmenlerinin Değerler ve Değerler Eğitimi Konusundaki Görüşleri. *Karamanoğlu Mehmetbey Üniversitesi Sosyal ve Ekonomik Araştırmalar Dergisi*, 117-124.

Teaching Mathematics With The Use Of The History Of Mathematics: Some Opportunities Offered By The World Of Psychophysics

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Abstract

The history of mathematics may be useful in education and represent a support in mathematics teaching mainly in two directions: on the one hand, arousing the students' interest in mathematics and, on the other hand, stimulating the reflection about mathematical concepts and methods. This work shows how the figure of Gustav Theodor Fechner (1801-1887) and the discipline of psychophysics which he founded should rightly constitute a chapter of the history of nineteenth century mathematics to be adequately re-evaluated also in the context of secondary school and university mathematics teaching (including teacher training). We will focus on the opportunities which a deep analysis of Fechner's contribution can offer in mathematics education of today.

1. Fechner And Psychophysics

Historians of science credit Gustav Theodor Fechner (1801-1887) with having founded the discipline of psychophysics; his work, which was entitled *Elemente der Psychophysik* and published in 1860, is the first official text of this "new" discipline, presented as a complete and mature science.

Owing to his theory, Fechner is recognized as the scholar who developed the first quantitative methodology of psychology. Fechner, in his work, aims constantly to unite psychology and mathematics, conceived as an essential component in achieving a measurement of mental variables. Mathematics plays in Fechner's theory a key role as a tool that can enable the realization of his scientific project and is a fundamental element for the sheer existence of the discipline of psychophysics, applied at a high level.

The figure of Fechner was central to the issue of mental measurement and his contribution (in terms of the measurement model he proposed) had a strong impact on the reality of nineteenth century measurement in its entirety, having influence up to today. So, his figure and work deserve a prominent place in the landscape of (applied) mathematics of that period.

Focusing on Fechner and psychophysics is of interest in so far as they can be adequately re-evaluated also in the context of secondary school and university mathematics teaching (including teacher training). The fascinating example of Fechner, the person, may significantly stimulate students' interest; an analysis of the concepts and methods (e.g., functions and calculus) used by him and by the subsequent scholars who have dealt with psychophysics provides a good aid to see mathematics from a new point of view and in a new work environment (particularly engaging, concerning our human nature, and different from the traditional approaches: Regarding the interaction of the domains of mathematics education and the history of mathematics in the process of mathematics teaching, see, e.g., Furinghetti & Radford, 2008, and Fenaroli, Furinghetti & Somaglia, 2014).

1.1 Fechner, A Fascinating Figure

Fechner's conception of psychophysics stems from his education, as a physicist and a philosopher, and his life and personality: The study of his figure and the origin of his thought is fundamental for a correct interpretation of his psychophysical theory, in which science and philosophy fuse, and is a very good example for showing (secondary school and university) students how we work when doing (applied) mathematics.

A singularly eclectic figure, when he left school, Fechner attended the Academy of Medicine in Dresden and enrolled at the Faculty of Medicine at the University of Leipzig, where he followed lectures also in logic, botany, zoology, physics, chemistry, pharmacy, anatomy, physiology, obstetrics, and algebra.

Fechner's decision to study medicine soon proved to be an unhappy choice. Although he completed his studies, Fechner did not feel totally fulfilled in this discipline and decided against practising it. Such a negative reaction towards medicine found expression in the satirical contributions which he published under the pseudonym of "Dr. Mises" (see Antonelli & Zudini, 2011). However, none of this undermined Fechner's enthusiasm for science, which remained the fundamental interest of his life.

Fechner was physicist, physician, and philosopher, professor at the University of Leipzig. Initially attracted by the "philosophy of nature" ("Naturphilosophie") - which at that time went against Newton's doctrine, supporting instead the idea of the universe as an animated organism -, he extended his interests to physiology, physics, chemistry, and meteorology. In 1834 he became professor of physics and in 1835 founded the first physics institute in Germany, in the newly-built "Augusteum" in Leipzig. Fechner carried out research mainly on the theory of electricity, electromagnetism and electrical chemistry. Among the first scholars to recognize the importance of Ohm's law (1827), he distinguished himself by using the quantification method and by collecting a great amount

of experimental data, which he then analysed and discussed in his research. In 1832 he published the “Repertorium der Experimental-Physik”, forerunner of the journal “Fortschritte der Physik”, which was founded in 1845 (for more details regarding Fechner’s figure and work see, e.g., Brožek & Gundlach, 1988, Heidelberger, 1993, and Zudini, 2009).

1.2 The Definition Of Psychophysics

The central role which mathematics would have in psychophysics is clear from the very definition of it at the beginning of *Elemente*: Psychophysics is conceived by Fechner as the “exact doctrine” of the “functional or dependence relationships” between body and soul, more generally, between the bodily and spiritual, physical and psychical worlds (Fechner, 1860, vol. I, p. 8).

A first element emerges immediately in this definition: the conception of psychophysics as “exact doctrine”, which is characterized, in particular, as a study of the quantitative links that bind physical stimuli to mental variables (sensations) related to them. The basic idea of the conception is to consider the human perceptual system as a measuring instrument (more precisely as a physical instrument) that allows the quantification of sensory experience.

The philosophical basis for an assumption of this kind is the second major element in the definition of psychophysics: the “functional” conception of the relationships between body and soul, matter and spirit, and, more generally, between the physical and the psychical worlds, which in Fechner takes the form of an “identity view” (“Identitätsansicht”), already presented in the appendix to the second part of the work *Zend-Avesta* (Fechner, 1851; see also Heidelberger, 1993). In *Zend-Avesta, oder über die Dinge des Himmels und des Jenseits. Vom Standpunkt der Naturbetrachtung*, Fechner’s panpsychist philosophy finds expression in the theory of universal animation, which goes back to Friedrich Schelling and has a strong oriental character, and the program of the future discipline of psychophysics is already presented in an embryonic way.

According to the “identity view” by Fechner, matter and spirit are expressions of a single reality which manifests itself at times in one way and at times in another, just as the two sides of the same coin or medal, depending on the (internal or external) observation point from which one looks at it. On the basis of the principle of identity view, Fechner postulates the existence of a general and constant relationship of functional dependence between physical and psychical phenomena, that can be expressed in exact terms, through a law which has, as he intends it, elementary and universal character, similar to that of the law of gravitation. This allows, in Fechner’s theory, quantitative analysis of psychical dynamics and paves the way to realizing his project of a scientific foundation for the disciplines of the mind.

The appendix to the second part of the work *Zend-Avesta* is also important because, as above mentioned, it contains, in an embryonic way, a “new principle of mathematical psychology”, which would be the basis of the future discipline of psychophysics (Fechner, 1851, vol. II, pp. 373-386). Fechner himself remembers the morning of October 22, 1850 (still celebrated today as the birth date of psychophysics) when, while he was in bed, he had the intuition that the relative increase in the physical vital force could be the measure of the increase in the corresponding mental intensity (Fechner, 1860, vol. II, p. 554).

The aim to carry out the experimental measurement of the sensations and the foundation of a quantitative science, which is evident from the very definition of psychophysics as “exact science”, clashes with the (seemingly insurmountable) problem of the inaccessibility of sensations from direct, external observation.

As we will see, Fechner solves this problem by developing a “correlative theory” of the measurement. Instead of a direct measurement, he implements a psychical quantification by indirect means, through physical processes corresponding to the sensation, on the basis of the functional relationship of reciprocity that allows a scholar to choose the observation point which seems the better one (or, ultimately, in this specific case, the only feasible one): The scholar can measure the stimuli correlated to a sensation and determine the thresholds of sensations, using them as a unit of measurement.

1.3 Fechner’s Model Of Measurement

According to Fechner, any exact doctrine has to begin with the measurement of its objects; therefore, it is necessary to show how psychophysics allows the measurement of psychical magnitudes.

Already in 1858, anticipating the treatment of *Elemente*, Fechner had considered the status of measurement in psychology and had noted the problems and the relevant polemics connected with this operation (Fechner, 1858). Fechner was convinced that a quantitative aspect was undeniable in psychical phenomena; the question was to prove the actual correlation between quantity and measure in them.

“Measuring” means describing data through numbers, and therefore using mathematical rules in investigations. Fechner says clearly how this should be done in psychophysics when he affirms, proposing an “Euclidean model of measurement” (Zudini, 2011), that:

In general, the measurement of a magnitude consists in verifying how many times a magnitude of the same kind taken as a unit is contained in it. (Fechner, 1860, vol. I, p. 45)

Sensations are to be measured through the measurement of the stimuli that induce equally perceptible sensations, finding a method for establishing the equality between two given sensations. The specific method adopted by Fechner is the following: Two sensations of the same kind are perceived as different only when the difference between the corresponding physical variables is greater than a minimum value (“differential threshold”).

As explained in Zudini (2011), Fechner faces the problem of measurement in two phases: In the first phase, he intends to indicate the conditions, which are necessary and at the same time sufficient, for saying, in general, that a magnitude, both of physical and psychological nature, is measurable - from 1858, he will call these conditions the “general principle of measurement” (“allgemeines Maßprinzip”). With the second phase, Fechner seeks to put into practice the principle of measurement for psychological magnitudes, that is, to find an empirical application of this principle in the psychological field.

1.3.1 The General Principle Of Measurement And Its Application In The Psychological Field

So as to guarantee the possibility of measuring a magnitude, the general principle of measurement sets out a series of conditions, which can be expressed schematically in the following way (Heidelberger, 1993, p. 220):

1. Magnitudes have to be conceived as phenomena that can increase or decrease in a continuous way;
2. There must exist a grade of difference, which can be reproduced or verified in various situations, such that one can decide if it is equal or not to the grade of difference between any other two magnitudes;
3. One can distinguish the conditions under which a magnitude has the value zero.

These conditions determine the possibility of measuring in the sense of “counting equals”. In fact, Condition 2 gives a value “difference” that can be compared with other differences and therefore used as a unit for measurement. Any other value can in fact be expressed as consisting of a number n of units, starting from zero (Condition 3).

The general principle of measurement has a clearly theoretical character since it does not explain, for example, how to reproduce or discover the magnitude unit, nor how to proceed to the necessary comparisons between magnitudes. This principle is therefore to be considered in the light of the various types of magnitudes and verified in its validity in every field.

In the case of mental phenomena, according to Fechner, one can see at a glance that Condition 1 is satisfied, insofar as mental phenomena such as consciousness or attention are susceptible to a variation in grade; sensation, feeling, instinct, or volition can be weak or strong. Sensations can therefore be conceived as continuous magnitudes generated according to a gradual process starting from the zero condition.

Condition 2 requires us to be able to estimate the equality of the differences of sensations, which is, in general, difficult to carry out. In the case of sensations that are present at the same time and very different in intensity, a subject is, at most, able to estimate that one is stronger than the other; but to assess the size of the difference between the two is a very different thing. The latter implies that we have successfully derived a scale of sensation strength. To find this kind of scale, we need a unit. The difficulties that recur in this operation come from the very nature of sensations, which cannot be treated as material objects. For example, they cannot be put side by side as one does when estimating the length of two objects; neither is it possible to find a standard that allows for such a comparison.

The question is to find a proper procedure for psychological magnitudes; for this purpose, it is sufficient to exploit two other conditions which are valid for physical standards of measurement and which we can formulate in the following way (Heidelberger, 1993, p. 224):

4. A definition of a standard unit of measurement of physical magnitudes can be obtained by relating this unit to other dimensions, with which it is functionally connected;
5. In order to achieve standards of measurement of physical magnitudes we have to rely on our mental impressions, which are produced in us by the material quantities.

Condition 4 means that, when we measure physical objects, we have to deal not with pure dimensions but with dimensions which are expressed through concrete standards, as happens, for example, in the case of time: Fractions of time are measured not directly through time itself but using an external, concrete standard, such as the movement of the hand of a watch.

It is clear that, when we measure units of time, we have to deal with the units of space with which they are connected, considering as a point of reference both the movements of the heavenly bodies and the hands of the watch. That happens in (classical) physics also for forces: The forces themselves are not measured directly (which is impossible); we measure, instead, magnitudes which are relevant or dependent on them, such as the velocity variation of equal masses, or the differences of masses having the same velocity.

According to this interpretation of measurement, which could be defined as “correlative” (Heidelberger, 1993; Murray, 1993), for the measurement of any dimension Q, we need a directly observable dimension R and a device or apparatus of measurement A, properly calibrated and able to represent the values of R in correlation with those of Q in a unique and monotonic way (i.e., capable of preserving the order of the values of the two dimensions).

In the above quoted case of time, which is measured through the movements of the hands of the watch, we can construct a watch in order to supply such a representation: If we know the length of a distance covered by the hand d , we have at a glance the quantity of correspondent time t , according to the formula (“measurement formula”) $d = c \cdot t$, with c constant.

In the case of sensation, we have to search in an analogous way for a dimension which is correlated to it as space is to time, and that dimension is, according to Fechner and his “identity view,” the external physical stimulus. The apparatus that plays here the role of the watch is the human body, which is able to correlate, as the model of measurement itself demands, the values of intensity of sensation with those of stimulus. We must only find the “measurement formula” that expresses that correlation.

Condition 5 emphasizes the importance of sensorial impressions in the process of constructing standards of measurement of physical magnitudes. Still considering the example of time, if we use a watch, calibrated in minutes, it is evident that we conclude that a minute has passed from the mental impression that the distance covered by the hand is equal to the space between two notches. In the process of derivation of standards of measurement for physical magnitudes, the consciousness of equality of a standard to the measured object is fundamental, and this consciousness depends on the subjective mental impressions which we have of concrete physical quantities. The subjective component is therefore necessary in the process of measurement, but can be made objective, restricting its role to the function of comparison of the correspondences existing between the device of measurement and the measured object.

In the process of measuring physical magnitudes we use mental impressions in order to determine the equality of standards and measured objects; therefore, we determine the magnitude of the physical by connecting the physical with the psychical. In the case of measuring psychical magnitudes, on the other hand, we have to reverse this relation. This is possible only after arranging and calibrating a physical scale in such a way that equal psychical magnitudes result from intervals of equal dimension on the scale, according to a law which allows us to connect increments of stimulus and increments of sensation and to deduce therefore, from the intensity of the stimulus, the intensity of the associated sensation.

In the case of measuring time through a watch, the determination of such a law is simple, since equal intervals of time correspond to equal distances covered by the hand. That does not happen for the measurement of sensation through the stimulus connected with it; in such a case, equal differences in sensation do not correspond to equal differences in the stimulus.

The question is to find a function that expresses the reality of the process. The solution to the problem proposed by Fechner follows, by analogy, the procedure used in (classical) physics for measuring forces: In this case too, we can try to measure the magnitude of the sensation produced by equal stimuli or the magnitude of the stimuli which induce an equal sensation. The first possibility is, however, not practicable in psychophysics, since sensation is not susceptible to direct measurement; therefore, the second possibility is left, which consists of assuming the variable sensation as constant and in measuring the physical stimuli for which it remains constant. Here, the distinction made by Fechner between absolute sensitivity and differential sensitivity comes into play. With the first, he means the organic response to the absolute value of a given stimulus; the second refers, on the other hand, to the response to the relative difference between two stimuli and varies according to the variation of the absolute magnitude of the stimulus.

1.3.2 The Measurement Of Sensations

With such conditions posed for measurement, we have to be able, according to a model which follows Euclid (Zudini, 2011), to find a homogeneous unit of measurement and to determine the number of times in which it is contained in the magnitude to be measured. As time is measured through the hand of the watch and space through the ruler, so we can deal with sensation, using the stimulus for its measurement: We proceed to subdivide sensation into equal sections (i.e., in the equal increments which its growth from zero consists of) and to consider the number of these equal sections as determined by the number of the correspondent increments of the stimulus, which can provoke equal increments of sensation (“Maßprincip”).

These increments in sensation, determined through physical units of variable magnitude which are able to provoke equal increments in sensation, are assumed as units of measurement.

The sensations, as we know them, satisfy, therefore, in Fechner’s system, the conditions posed for measuring a magnitude. In particular, the fulfilment of those conditions is strictly connected with Fechnerian thought in its totality and achieved on the basis of the parallelism between the physical and psychical and of the functional relation of reciprocity which justifies the scholar in choosing the point of view which he considers more proper (or the only practicable). If we cannot measure sensations directly, nevertheless we can measure the stimuli that provoke them and determine the thresholds of sensations, especially the differential ones, using them as the unit

of measurement; we have to measure sensations through the measure of the stimuli that induce equally noticeable sensations, finding a method for determining the equality of two given sensations.

For this purpose, Fechner uses the results on differential sensitivity obtained years earlier by the physiologist Ernst Heinrich Weber (1795-1878), according to which equal relative increments in stimulus correspond to equal increments in sensation (see Weber, 1834, 1846); he generalizes them and, also with the aim of statistical methods, sets out what he calls “Weber’s law” (“Weber’sches Gesetz”).

1.3.3 Fechner’s Measurement Formula

Starting from Weber’s law, Fechner takes what he considers to be an experimental result - the fact that the just noticeable difference in sensation is constant - and applies the differential and integral calculus to sensation conceived as a phenomenon which increases in time and is susceptible to infinitesimal variations.

Moving from the differential equation:

$$d\gamma = k \frac{d\beta}{\beta}$$

by integrating both members of the equation and imposing the condition of the threshold for the stimulus magnitude - i.e, for the threshold value of the stimulus magnitude, the sensation magnitude is zero -, Fechner obtains his famous logarithmic “measurement formula” (“Maßformel”):

$$\gamma = k \log \frac{\beta}{b}$$

where γ is the sensation magnitude, β the stimulus magnitude, b the threshold value of the stimulus magnitude β (called the “absolute threshold” of the stimulus magnitude), and k is a constant (called “Weber’s constant”, depending on the sensory modality) (see Fechner, 1860, vol. II, pp. 10-13; for in-depth analysis of this formula, see Masin, Zudini & Antonelli, 2009, and its references).

The formula of measurement proposed by Fechner is called, in current psychophysics and, generally, in science, “Fechner’s law” (see Figure 1) and is considered the first explicit, quantitative formulation connecting sensations with stimuli (Algom, 2003).

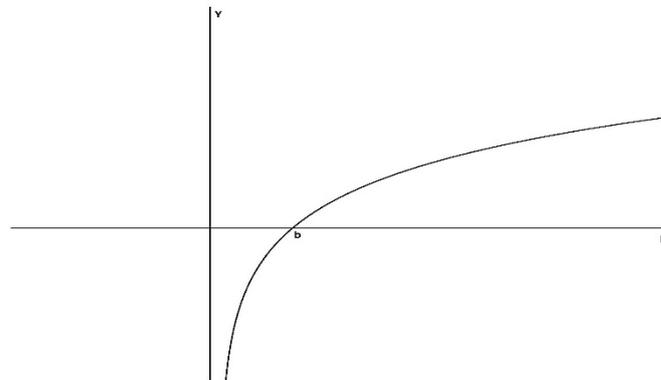


Figure 1. “Fechner’s law”

Fechner arrives at his result giving credit to several scholars who preceded him (see Fechner, 1860, vol. II, pp. 548ff.): first of all, the aforementioned Ernst Heinrich Weber, who, according to Fechner, gave unity to various events observed in the psychophysical sphere and brought new evidence to the discipline, making it an exact and “connected” science. It was he who set out the first clear and, in some way, general enunciation of the psychophysical law, determined by using a method of measurement of sensation in almost all the fields of perception and called by Fechner “Weber’s law”.

According to Fechner, a fundamental role in the development of his psychical measurement theory (“Maßlehre”) was also played by researchers who studied the mathematical (logarithmic) function through which psychical magnitudes are linked to physical quantities in some specific areas: Among these, Daniel Bernoulli is to be mentioned with his determination of the dependency relationship of “moral fortune” on “physical fortune” (see Bernoulli, 1738).

By elaborating all these contributions in the context of a very particular panpsychist philosophy, Fechner comes to the determination of the functional relationship between the physical and mental worlds, between body and soul,

formulating a law which expresses their relationship in precise and quantitative terms and, in this way, achieves a psychological “measurement”.

Fechnerian psychophysics, whose principal result is Fechner’s law, represents therefore a composite theory in which different elements or “ingredients” are harmoniously fused together (Zudini, 2009) according to the following schema (Figure 2):

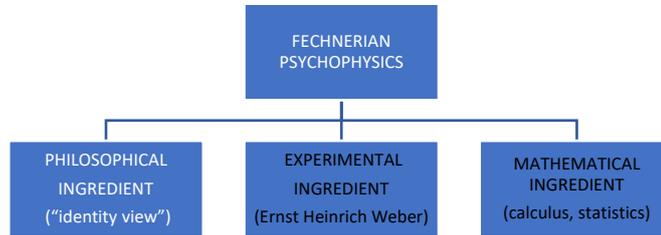


Figure 2. The structural system of Fechner’s psychophysics

The mathematical ingredient, as reported in this scheme, assumes a key role inasmuch as it enables Fechner to treat mathematically mental phenomena and to pursue his aim of building a psychological metric, anchored in the physical world (see Romano, 1976).

2. Fechner’s Heritage

The impact of Fechner’s work was immediately great on the scientific community: For the first time, a rigorous project of empirical and experimental research, which was guaranteed by the possibility of measuring mental phenomena, based upon mathematics, was begun and carried out (see Zudini, 2011).

2.1 The “Fechner Case” And The Debate On It: From Then Up To The Present Day

Fechner’s project was the object of lively discussion, in particular in the Mitteleuropean cultural world (extending to France and Belgium) among scholars from very different disciplines, who dealt with the “Fechner case”: Among them, many scientists of the nineteenth and twentieth centuries, such as Joseph Antoine Ferdinand Plateau, Hermann von Helmholtz, Ernst Mach, Jules and Paul Tannery, Joseph Delboeuf, and David Hilbert, are to be mentioned (see Zudini, 2009, 2011; Antonelli & Zudini, 2012; Zudini & Zuccheri, 2016).

The model of measurement proposed by Fechner became that of reference, which no scholar could neglect: a model to criticize, correct, or confute, in the methodological aspects of its (empirical and mathematical) procedures or even in its psychophysical, physiological, or, in a strict sense, psychological value itself; in certain cases, it was a model to reject in a radical way, on the basis of the assumption that it was impossible to measure sensations and, in general, psychical magnitudes and therefore to make a scientific study on them.

So, as described in Zudini (2011), Fechner’s destiny would be analogous, in a certain way, to that of Euclid, whose model was considered for centuries as the “summa” of geometrical knowledge and of logical rigour, as the correct idealization of the properties of physical space and of the figures of this space, and was then called into question in particular with the advent of non-Euclidean geometries in the nineteenth century. Fechner’s attempt to apply a model of measurement to sensation magnitudes which goes back to Euclid himself (Zudini, 2011) - and the debate that followed - generated ideas, concepts and theories which were destined to have rich developments in the scientific field of the twentieth century and that still animate and are relevant in current psychophysics.

The discussion on Fechner’s work was initially developed from three types of issues: The first concerned the correctness of the law proposed by Fechner on the basis of the experimental data and the mathematical techniques which he used; the second was related to the very nature of the law; the third regarded the possibility of measuring sensations and mental magnitudes in general. In particular, it is to be said that the response given by the cultural world of the French language to Fechner’s psychophysics was negative both from a theoretical and a mathematical point of view, based on the conviction that the application of mathematical models to the psychical sphere required further analysis and experimentation.

As for the first aspect, namely the correctness of the mathematical law obtained by Fechner - the aspect which is the most interesting in this context and on which we focus, also considering the development of psychophysics -, the contribution of Joseph Antoine Ferdinand Plateau (1801-1883), a Belgian physicist and professor at the University of Gand (Ghent), is to be mentioned. Starting from experiments which he conducted on the bisection of sensorial intervals (Plateau, 1872), Plateau, unlike Fechner, derived a power function as psychophysical law (which was also proposed by the German philosopher and psychologist Franz Brentano (1838-1917): See Brentano, 1874). Plateau’s power function would come to the fore again about a century later, in the so-called “modern psychophysics” of the American S. S. Stevens (Stevens, 1957). The latter liked to mention Plateau among those who, in the nineteenth century, had anticipated his power law.

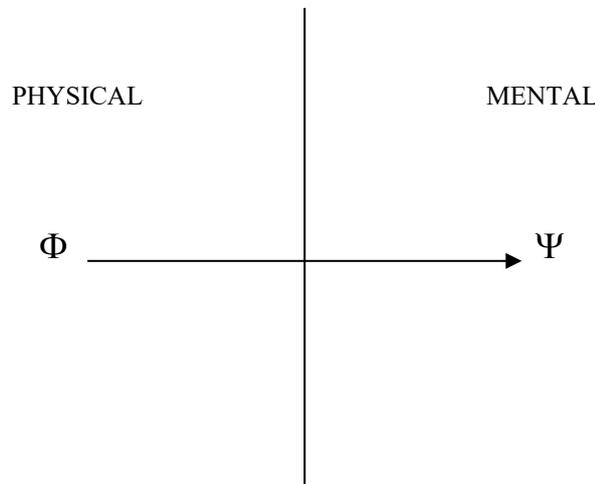
The general form of this law is

$$\psi(I) = kI^a$$

where I is the magnitude of the physical stimulus, $\psi(I)$ is the subjective magnitude of the sensation evoked by the stimulus, a is an exponent which depends on the type of stimulation, and k is a proportionality constant which depends on the units used.

2.2 Toward A “New” Conception Of Mental Measurement

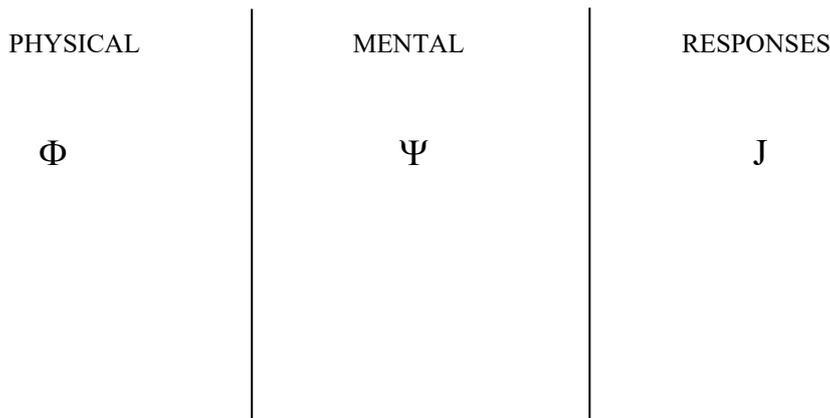
Starting from the 18th century, the question of the possibility of measuring the intensity of mental variables was much discussed. Fechner, Plateau, and other contemporary scholars treated this question considering the two “worlds”, the physical and the mental ones, as arranged according to the following schema:



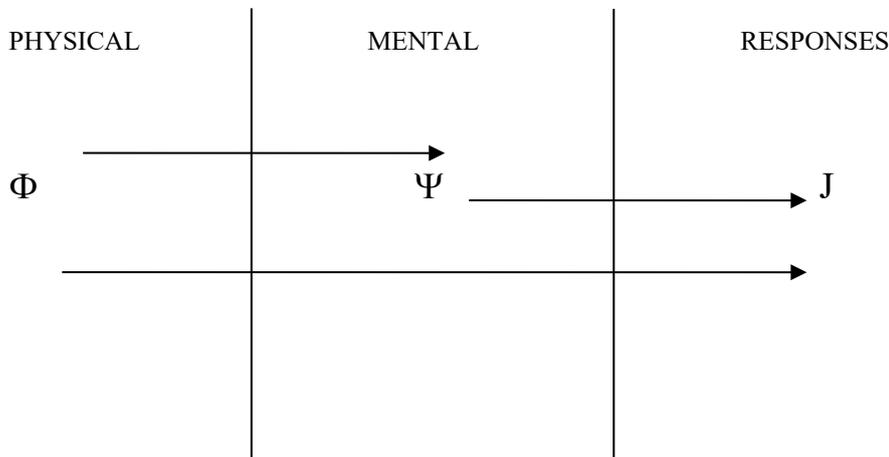
In this schema, a mental variable Ψ corresponds to every physical variable Φ . The problem is then reduced to finding the function (“psychophysical law”) that connects Φ and Ψ .

It is evident that in this formulation, which dominated the history of psychology from Fechner until the 1960s, the problem is somewhat simplified because of the (undoubtedly limited) way of conceiving physical and mental variables. It is clear, in fact, that, for certain mental variables Ψ , there is no physical correspondent Φ . The very search for the function that connects Φ and Ψ creates difficulties, related to the arbitrary nature of the choice of the formula, among the various existing possibilities, and the measurement units used from time to time (see Masin, 2003, 2004).

Starting from the 1960s (Attneave, 1962; Curtis, Attneave & Harrington, 1968), a new way of dealing with the problem was stated, characterized by a decisive “leap in quality”; the schema became more complex, involving a further “world”, that of the responses (of a subject):



Responses played an important role and had to be taken into account, as the world of responses of a subject is accessible, unlike the mental one.



The relationship between Φ and Ψ is what Fechner sought, while the relation between Φ and J is known, since it is possible to measure the variables Φ and the variables J . For a psychologist, it is more important to determine the relation between Ψ and J .

For example, if the relationship between Ψ and J is the identity, we would have

$$J = \Psi$$

as Stevens, essentially, affirmed.

Other authors have believed, on the contrary, that

$$J \neq \Psi$$

A possible hypothesis is that J is equal to Ψ , up to an unknown constant, namely

$$J = a \cdot \Psi$$

with a an unknown constant.

Another possibility, less “good” (from the operative point of view, for those who do research in psychology) than the former, is that

$$J = a \cdot \Psi + b$$

with a and b unknown constants.

Further, it is possible that there are more complex relationships between J and Ψ , namely:

$$J = F(\Psi),$$

with F a non-linear function.

In psychology, scholars are interested in knowing which relationship is the correct one, in order to calculate Ψ .

Today, in the context of mental measurement, the studies by Norman H. Anderson, carried out starting from the 1960s, are an example of interest. Anderson has proposed a theory called “information integration theory” (hereafter, IIT) which “illustrates” the “modern aims” of psychophysics (Masin, 2004).

Through this theory (see, e.g., Anderson, 1981, 1982, 1991), Anderson intends to “enter” into the human mind more than Fechner and others before him did: He “reaches” not only Ψ , but “arrives” at measuring the mental quantities which are generated “before” Ψ , according to a procedure appreciably different from that of classical psychophysics.

Anderson formulates two axioms, the axiom of “purposiveness” and the axiom of “integration”, and starting from these develops, on an inductive basis, his theory. This is proposed as a “unified” theory (Anderson, 1996) and aims at explaining, by using the very concepts of everyday life, the multiplicity of factors that contribute, combining (or indeed integrating) with each other, to the processing of information in various mental processes, in the context of a vision of a human being as an active elaborator of information in order to reach different goals.

IIT gives, according to Anderson (2007), a solution to the age-old problem of measuring the sensations in psychophysics, going beyond the question of determining the “psychophysical law” between stimulus (physical variable) and sensation (mental variable) which was typical of classical psychophysics.

IIT aims not only at measuring the intensity of sensations, but also at discovering the laws governing the process of integrating information in the context of the genesis of the sensations themselves; the measurements of this

information are obtained on the basis of these integration laws (which are said to be simple: additions, multiplications, weighted averages, or combinations of these - hence the idea of a “cognitive algebra” as a tool not only in psychophysics, but in the entire psychology).

IIT can be schematized using a diagram (“functional measurement diagram”) (Figure 3), where the (observable) stimuli, indicated by S_1, S_2, S_3 , on the left side of the diagram, are factors of the (observable) response, denoted by R , on the right side of the diagram.

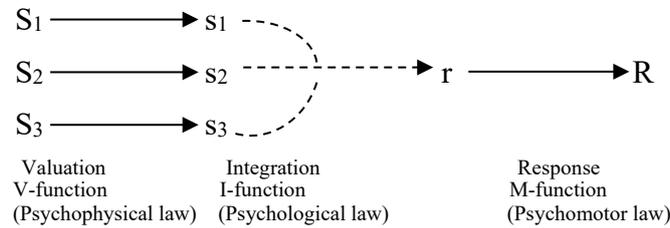


Figure 3. The functional measurement diagram, which is based on Anderson (1981, p. 5)

Between each of the stimuli S_i and R there are three functions: the valuation function (or “psychophysical law”), the integration function (or “psychological law”), and the response function (or “psychomotor law”), in symbols $V, I,$ and $M,$ respectively, representing the transition from S_i to R . The S_i are transformed, through the valuation function V , into the corresponding (not observable) psychological stimuli s_i ; these stimuli s_i combine with each other, through the integration function I , into the unitary, implicit (unobservable) response r , which is then transformed by the response function M into the (observable) R response, according to

$$\begin{aligned} V(S_i) &= s_i \\ I\{s_i\} &= r \\ M(r) &= R \end{aligned}$$

Three unobservable entities are present in the diagram: the integration function I ; the psychological stimuli s_i , corresponding to the physical ones S_i and internal to the body, often unconscious; the implicit answer r , which can be conscious, but it is also internal to the body.

Functional measurement solves the problem of “the three unobservable entities” through the joint solution of the following three related problems:

1. the measurement of the psychological stimuli s_i ;
2. the measurement of the implicit response r ;
3. the determination of the integration function I .

2.3 Psychophysics And “Virtual Reality”: Looking Ahead To The Future

Today’s psychophysics - obviously evolved from Fechner’s time in terms of physiological and methodological knowledge, as we have briefly seen - is a lively area of research that analyses the perceptual processes by studying the effects of physical stimuli on a subject. These stimuli are constructed by an investigator according to his research needs and have controlled and defined physical properties. Stimuli can be of visual, auditory, tactile and olfactory type.

Psychophysical research is aimed primarily at determining the “perceptual threshold” value below which sensory stimuli are not perceived. Scholars have to systematically vary the magnitude of the stimuli on the basis of different methodologies, in order to define “psychometric” functions, which describe the link between the magnitude in question and the extent of the perception that human beings have of it. Therefore, they proceed, in the context of an “experiment”, collecting “experimental data”, which express, through their numerical value, the perceptions that subjects have according to the variation of the magnitude of the stimuli. An experiment places subjects in a “small virtual reality”: Subjects’ tasks will be to indicate (often simply responding to a question with only two forced answers) their own level of perception of the magnitude in its variation.

With the advent of computers, computational capabilities have been revolutionized: In just a few years, it has become possible to obtain performances that greatly reduce the time required to simulate, analyse and solve “systems”; the number of variables that can be used in the experiments has been significantly increased and the quality of the response of the simulated systems has radically improved. The electronic calculation methods, gradually developed due to technology, have become essential instruments for the realization of “virtual realities”, which are able to simulate systems in almost all their aspects.

In the research field of psychophysics, experiments can actually be considered “small virtual realities”; subjects interact with these and respond on the basis of their own perceptions and cognitions. Using a programming language, combined with graphics and sound libraries, scholars can create virtual environments on the computer with highly realistic graphic and sound details. “Optimal” software tools for the realization of experiments of

visual and acoustic perception with the use of an electronic calculator, and then for the creation of small virtual realities, are “MATLAB” and the “Psychtoolbox” libraries (here the term “optimal” refers to a balance between the high calculation performances obtained and the low production times of the final result: This is possible thanks to “MATLAB”, which makes available almost all the mathematical tools through a very intuitive and simplified language; therefore, one can initialize and process large amounts of data with a minimum design effort. See, e.g., Brainard, 1997, Pelli, 1997, and Shreiner et al., 2012).

Psychophysical experiments require the use of mathematical tools (such as analytic geometry, numerical analysis, trigonometry, Boolean algebra, complex analysis, statistics) primarily for defining and processing the data which are representative of the stimuli and reworking the output data (i.e., the magnitudes related to subjects’ responses).

3. Conclusion

Following the way of “mathematization” indicated by Fechner and developed afterwards, psychophysics has elaborated over time increasingly rigorous methods for studying mental events, namely for evaluating and modelling them. These methods have been incorporated into many different disciplines (e.g., sensory systems, cognition, memory, psycholinguistics) and - often being modified to meet the specific needs of each discipline - have contributed, in a significant and successful way, to the state of knowledge in them.

Fechner’s project of combining mathematics and psychology to achieve a mathematical treatment of the mind and constituting a mathematical science of humans has therefore borne fruit. We can hazard that psychophysics, as a discipline, has gone beyond the most optimistic expectations of Fechner, who was, after all, a son of the physiological and technical knowledge of his time.

As the present work has shown, in the development of psychophysics, mathematics has always played, from its origins until today, a central role in order to unite the physical world and the mental world - as the name of psychophysics itself suggests.

Those who do psychophysical research can realize it every day. And Fechner deserves to be remembered for his mathematical contribution, just as the psychophysical scholars, members of ISP (“International Society for Psychophysics”), have organized every year, since 1985, a “Fechner Day” in order to discuss psychophysics and its developments or trends. It is no coincidence that, when possible, “Fechner Day” takes place on the anniversary of the intuition, mentioned at the beginning of the present work, that Fechner had on October 22, 1850 - namely, that the relationship between the stimulus and the sensation was capable of being expressed in mathematical terms (specifically, with a logarithmic formula) - and from which psychophysics would originate.

References

- Algom, D. (2003). Psychophysics. In L. Nadel (Ed.), *Encyclopedia of cognitive science*. Volume 3 (pp. 800-805). London: Natura Publishing Group.
- Anderson, N. H. (1981). *Foundations of information integration theory*. New York: Academic Press.
- Anderson, N. H. (1982). *Methods of information integration theory*. New York: Academic Press.
- Anderson, N. H. (1991). *Contributions to information integration theory*. 3 Volumes. Volume I: Cognition. Volume II: Social. Volume III: Developmental. Hillsdale: Lawrence Erlbaum Associates.
- Anderson, N. H. (1996). *A functional theory of cognition*. Mahwah: Lawrence Erlbaum Associates.
- Anderson, N. H. (2007). Unified science based on psychological laws. In S. C. Masin & G. Vidotto (Eds.), *Applications of functional measurement in psychology* (pp. 13-40). *Teorie & Modelli*, 12(1-2), Special issue.
- Antonelli, M., & Zudini, V. (2011). Solving a riddle: A ‘Rätsel’ from Dr. Mises’s *Rätselbüchlein*. In D. Algom, D. Zakay, E. Chajut, S. Shaki, Y. Mama, & V. Shakuf (Eds.), *Fechner Day 2011. Proceedings of the 27th Annual Meeting of the International Society for Psychophysics* (pp. 227-232). Raanana: The International Society for Psychophysics.
- Antonelli, M., & Zudini, V. (2012). From mathematics to psychophysics: David Hilbert and the “Fechner case”. In C. Leth-Steensen & J. R. Schoenherr (Eds.), *Fechner Day 2012. Proceedings of the 28th Annual Meeting of the International Society for Psychophysics* (pp. 174-179). Ottawa: The International Society for Psychophysics.
- Attneave, F. (1962). Perception and related areas. In S. Koch (Ed.), *Psychology: A study of a science*. Study II. Empirical substructure and relations with other sciences. Volume 4. Biological oriented fields: Their place in psychology and in biological science (pp. 619-659). New York: McGraw-Hill.
- Bernoulli, D. (1738). *Specimen theoriae novae de mensura sortis*. *Commentarii Academiae Scientiarum Imperialis Petropolitanae*, 5, 175-192.
- Brainard, D. H. (1997). The Psychophysics Toolbox. *Spatial Vision*, 10, 433-436.
- Brentano, F. (1874). *Psychologie vom empirischen Standpunkt*. Leipzig: Duncker & Humblot.
- Brožek, J., & Gundlach, H. (Eds.) (1988). *G. T. Fechner and psychology*. *Passauer Schriften zur Psychologiegeschichte*, Nr. 6. Passau: Passavia Universitätsverlag.
- Curtis, D. W., Attneave, F., & Harrington, T. L. (1968). A test of a two-stage model of magnitude estimation. *Perception & Psychophysics*, 3, 25-31.

- Fechner, G. T. (1851). *Zend-Avesta oder über die Dinge des Himmels und des Jenseits. Vom Standpunkt der Naturbetrachtung*. Leipzig: Voss. (Reprint Eschborn: Klotz, 1992.)
- Fechner, G. T. (1858). Das psychische Maß. *Zeitschrift für Philosophie und philosophische Kritik*, 32, 1-24.
- Fechner, G. T. (1860). *Elemente der Psychophysik*. Leipzig: Breitkopf & Härtel. (Reprint Amsterdam: Bonset, 1964.)
- Fenaroli, G., Furinghetti, F., & Somaglia, A. (2014). Rethinking mathematical concepts with the lens of the history of mathematics: An experiment with prospective secondary teachers. *Science & Education*, 23(1), 185-203.
- Furinghetti, F., & Radford, L. (2008). Contrasts and oblique connections between historical conceptual developments and classroom learning in mathematics. In L. D. English (Ed.), *Handbook of international research in mathematics education*. 2. Edition (pp. 626-655). New York: Routledge.
- Gundlach, H. (1992). *Entstehung und Gegenstand der Psychophysik*. Berlin: Springer.
- Heidelberger, M. (1993). *Die innere Seite der Natur: Gustav Theodor Fechners wissenschaftlich-philosophische Weltauffassung*. Frankfurt am Main: Klostermann. (English edition *Nature from within: Gustav Theodor Fechner and his psychophysical worldview*. Pittsburgh: University of Pittsburgh Press, 2004.)
- Masin, S. C. (2003). La legge psicofisica: un bilancio storico da Ipparco di Nicea a Norman H. Anderson. *Teorie & Modelli*, 8, 11-29.
- Masin, S. C. (2004). Storia e problemi della psicofisica. *Teorie & Modelli*, 9, 13-27.
- Masin, S. C., Zudini, V., & Antonelli, M. (2009). Early alternative derivations of Fechner's law. *Journal of the History of the Behavioral Sciences*, 45(1), 56-65.
- Murray, D. J. (1993). A perspective for viewing the history of psychophysics. *Behavioral and Brain Sciences*, 16(1), 115-186.
- Pelli, D. G. (1997). The VideoToolbox software for visual psychophysics: Transforming numbers into movies. *Spatial Vision*, 10, 437-442.
- Plateau, J. (1872). Sur la mesure des sensations physique, et sur la loi qui lie l'intensité de ces sensations à l'intensité de la cause excitante. *Bulletins de l'Académie Royale des Sciences, des Lettres et des Beaux-Arts de Belgique*, 2me Série, 33, 376-388.
- Romano, D. F. (1976). Der Beitrag Herbarts zur Entwicklung der modernen Psychologie. Eine geschichtskritische Analyse. In F. W. Busch & H.-D. Raapke (Eds.), *Johann Friedrich Herbart. Leben und Werk in den Widersprüchen seiner Zeit. Neun Analysen* (pp. 89-103). Oldenburg: Holzberg.
- Shreiner, D., Sellers, G., Kessenich, J., & Licea-Kane, B. (2012). *OpenGL Programming Guide*. Boston: Addison-Wesley Professional.
- Stevens, S. S. (1957). On the psychophysical law. *Psychological Review*, 64(3), 153-181.
- Weber, E. H. (1834). *De pulsu, resorptione, auditu et tactu. Annotationes anatomicae et physiologicae*. Lipsiae: Koehler.
- Weber, E. H. (1846). Der Tastsinn und das Gemeingefühl. In R. Wagner (Ed.), *Handwörterbuch der Physiologie, mit Rücksicht auf physiologische Pathologie*. Volume 3 (pp. 481-588). Braunschweig: Vieweg.
- Zudini, V. (2009). I numeri della mente. Sulla storia della misura in psicologia. Trieste: EUT.
- Zudini, V. (2011). The Euclidean model of measurement in Fechner's psychophysics. *Journal of the History of the Behavioral Sciences*, 47(1), 70-87.
- Zudini, V., & Zuccheri, L. (2016). The contribution of Ernst Mach to embodied cognition and mathematics education. *Science & Education*, 25(5-6), 651-669.

Teaching Medical Terminology: Implications For English For Medical Purposes Courses Of Instruction

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Abstract

English for Medical Purposes (EMP) has intrigued the researchers to study the different aspects of it including medical terminology. Majority of studies have emphasized the needs for training the learners in medical terminology, as it derives from Latin or Greek origin and is based on word root and affixation principles. However, there are a few empirical studies which have addressed this issue from learner-centered approach, particularly at Turkish EFL context. The present study discusses the effect of activities for teaching medical terminology conducted with L1 Turkish speakers. The study employed mainly qualitative-based methodology comprising teacher observations, student reflections, and semi-structured interviews along with pre- and post-test results. The findings suggest that the learners' vocabulary knowledge was improved after the implemented techniques. The paper suggests further implications and recommendations for EMP courses of instruction.

Introduction

The role of English as a lingua franca is surely eminent not only in global communication, but also in education, academic fields and print publications. Consequently, its role in English teaching has been reflected in English for Specific Purposes (ESP), where it has been applied to business, technology, computer science and many other disciplines. Similarly, the role of English also in medicine is increasing fast, as most of the publications, medical textbooks, journals and conferences are growing firmly in English (Chia et.al, 1999; Hwang & Lin, 2010). Concomitantly, English for Medical Purposes (EMP) has been branched out under ESP. Apart from academic demands, English has become vital at workplace, particularly in health care settings as well. For example, there is growing number of healthcare professionals (e.g., nurses, pharmacists, doctors) working in English speaking countries, or people from different countries visiting a specific country for health care services.

In terms of Turkey, a large number of citizens from different countries visit here for medical or health tourism purposes. According to the report by the Ministry of Health of Turkey Republic (2012),

“health tourism refers to travelling from the place of residence to another place for the purpose of protection and development of health and treatment of diseases, and benefiting from health and tourism opportunities by staying at the place of destination for minimum 24 hours. A person who travels for the aforementioned purposes is called “health tourist”. p. 5.

This necessitates the role of English to be important in health industry which also requires training health professionals in English to communicate their ideas to health tourists. Apart from that, the number of international students studying in Turkey is steadily rising, so does the number of international medical faculty students. To meet all these needs, several universities in Turkey have established medical faculties in English to prepare students for academic and workplace conditions. Consequently, this has posed requirements and tasks on parts of both trainers (e.g., universities, teachers) and trainees (e.g., medical students, to be- doctors, nurses, pharmacists) to meet the learners' needs. Considering that ESP is learner - centered approach (Hutchinson & Waters, 1987), researchers have conducted needs analysis to explore the learners' wants and demands in order to furnish them with most suitable methodology.

Literature Review

Needs Analysis

ESP can be defined as "an approach to language teaching in which all decisions as to contents methods are based on the learners' reason for learning" (Hutchinson & Waters, 1987, p. 19). These reasons can be *needs, wishes, wants and lacks* which all group under an umbrella term, *needs*. To meet the learners' needs, researchers in various countries have designed needs analysis, prepared or suggested syllabus and materials addressing these needs (Antic 2009; Karimkhanlouei, 2012; Popa, 2013; Faraj, 2015; Kayaoglu & Akbas, 2016; Celik, 2017; Celik & Topkaya, 2018 and others). The majority of the studies have implemented questionnaire and checked learners' perceptions towards their needs for EMP macro skills (reading, writing, listening and speaking).

When macro skills categorized under sub-skills, studies have paid more attention to EMP-related specific grammar points including present simple, past simple and present perfect tenses, passive voice and modal verbs, as they

have been found frequently used in EMP textbooks and instruction materials (Pavel, 2014; Faraj, 2015). Some of the studies have focused on activities attending to linguistic issues or skills such as grammar and lexicon for EMP (Antic, 2010; Pavel, 2014); moves in medical research papers (Antic, 2007), reading EMP related texts (Alagozlu, 1994; Tasci, 2007; Yeniceri, 2008); medical discourse (Hoekje, 2007), pronunciation (Labov & Hanau, 2005) vocabulary and others.

Vocabulary for EMP

Vocabulary knowledge plays a great role in EMP, because it is based on a specific terminology with Greek or Latin origin. Hence, having sufficient medical terminology knowledge is essential for the one who wants to be in medicine discipline. Since these words are built on affix rules, it is of significance to know not only the word roots but also the affixes. In this regard, studies have considered word formation rules and suggested training the learners in specific medical terminology (Antic, 2009; Pavel, 2014; Piroozan, Boushehri, Fazeli, 2016). To the researcher's knowledge, however, there are a few empirical studies addressing this question. To name a few, those studies address the issues concerning the perception of everyday language and medical terminology among international medical graduates in Australia (Dahm, 2011); discovering meaning of medical terms through word part analysis strategy in Iranian context (Taie, 2015), and checking the effectiveness of course instruction in terms of lay-medical vocabulary and formulaic language in New Zealand context (Wette & Hawken, 2016). Taie (2015) specifically focused on medical terminology and designed a student-centered approach in her study; however, although it showed satisfactory results, it was only limited to 'word parts analysis' (WPAS) technique, where words were split into roots and affixes and students were trained with this technique.

All in all, there is insufficient number of studies investigating the effectiveness of EMP courses of instruction (Ferguson, 2012), and they lack in directly offering student-centered approach, particularly of Turkish L1 speakers as well. Hence, motivated both by the literature and needs of the medical faculty and students at a private university in Turkey, the purpose of this study is to address the needs of L1 Turkish speakers in EMP focused lexical knowledge and train them particularly in medical terminology. The study was guided by a research question that specifically addressed the issue:

What evidence of the effectiveness of an EMP course can be seen from implemented methodology for teaching and learning medical terminology?

Methodology

Participants

The participants of this study were totally 30 students studying at English language preparatory course at a private university in Turkey. They were studying in this one-year course before enrolling at a medical faculty. The language proficiency level of the students was B1+ and B2 classified by a CEFR scale according to the proficiency test administered by the university. As part of a national curriculum, all of them had taken Biology course at a high school, which was also tested by national university entrance exam. As part of this course, students had studied human anatomy as well. In the first semester, the students took courses in grammar, reading and writing and listening and speaking for academic purposes, and content-based medical English. In the second semester, the same courses were followed except for content based English, and Medical Terminology course was added instead. This course was required mandatory, as it was deemed necessary by the medical faculty considering the needs of pre-medical students.

Instrumentation

For the purpose of this study, tests were used to check the learners' prior knowledge on unfamiliar terms related with three body systems, including endocrine system, nervous system, and the eye and ear. These particular systems were chosen randomly. The students were not told that these tests would be used for research purposes. The course period was from January till June, and was offered in 6 sessions a week. After implementing methodological activities and tasks with all chapters for the purpose of this study, posttest on pretested vocabulary knowledge used to check the effect of implementation, in particular how many words students could learn or remember. The test consisted of 90 multiple-choice (MC) questions with four options (answer choices) adapted from Fremgen & Frucht (2016).

Example test:

A medical term that means *polydipsia* is called _____

- A) many thirst
- B) many bacteria
- C) many hair growth
- D) many infected cells

Answer: many (excessive) thirst

Which term means *surgical repair of a nerve*?

- A) neuroplasty
- B) neuropexy
- C) neurorrhaphy
- D) neuropathy

Answer: neuroplasty

Apart from test results, students' reflections, teacher observation notes and semi-structured interview notes with students were collected to check the learners' perceptions respectively.

Design And Procedure

This study used pre-and post-test design to assess the learners' ongoing progress in terminology and implemented certain tasks to fulfill these needs. In the first academic week, students were introduced to general view of medical terminology in five sessions, so that they can have a general idea about word formation in medical terminology. After introduction sessions, the following tasks and methodologies were implemented during the course. It should also be noted that the techniques designed for the purpose of this study were implemented during the entire period of the course; however, the students' vocabulary knowledge was pre- and post-tested on only three body systems which were chosen randomly.

WPAS technique

WPAS (word process analysis) technique (Nation, 2001) deals with teaching vocabulary, and research has demonstrated that it has a successful effect on learning medical terminology as well (Taie, 2015). In WPAS, words were broken down into roots and prefixes/suffixes. For example, *brady* means slow, and when this word is used in combination with different word roots, learners were expected to critically transfer this knowledge across and build the meaning. In other words, for instance, the word *bradycardia* (*brady-* slow; *cardia-heart*) means slow heartbeat, and by already knowing the root and prefix, learners are expected to be able to build the meaning of *bradypnea* (slow respiration rate). This technique is also one of the most common methods offered in medical course-books (Cohen, 2008; Fremgen & Frucht, 2016 and others). These implemented activities helped students to think critically and transfer the already learned prefix/suffix to another term with the same prefix/suffix. It also facilitated the memorization, as there were many terms to learn. Student reflections on WPAS say:

S.B.: *'We should pay attention more to word root, prefix and suffix because they help me to memorize the terms'*.

A.B.: *'Prefix and suffix exercises were helpful because we can see the same parts in different chapters and in different words'*.

Terminology lab

The course was conducted through help of interactive tasks, videos and other visuals. In interactive tasks, they were asked to combine a correct prefix/suffix with given random word roots which were projected on board (Figure 1). In order to understand better and strengthen the vocabulary knowledge, supplementary videos and photos of checking terminology were also projected (Figure 2). Students found these online aids/activities very useful and claimed that they helped them to better learn the terms and recall them later. Moreover, students were also observed that they found traditional way of learning, i.e., only practicing by book, to be boring. On the other hand, technology-aided learning was found to be motivating in practicing the previous learned terms and supplementary to book exercises as well.

S.S.: *'I found it helpful to check my notes in book against the projected materials. Using only book would be boring; therefore, supplementing it with overhead projector, videos and other aids make the lesson enjoyable'*.

D.S.: *'More visuals and repetition through pictures helped me to learn and recall the terms, rather than focusing only on memorization'*.

S.Y.: *'I do not have anything to do with traditional way of teaching, but it won't be useful in terms of learning medical terminology'*.

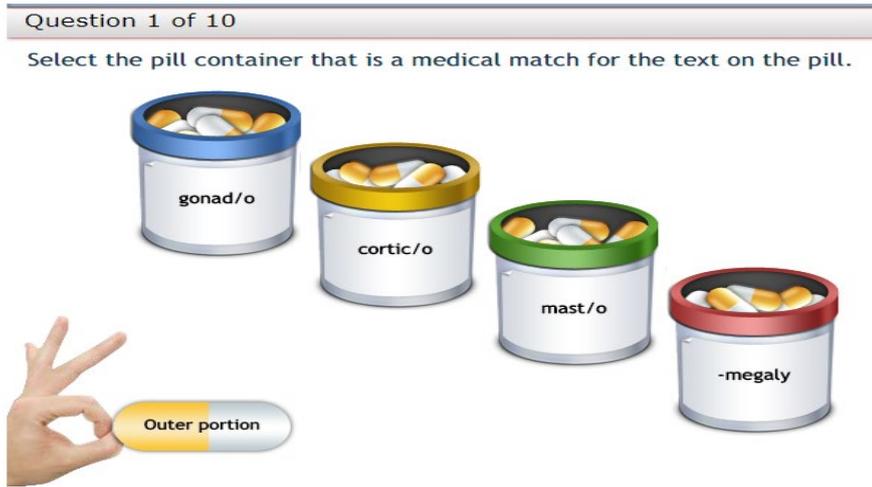


Figure 1. Root/Affix Exercises on Language Lab

Though great majority of the students found technology-aided learning to be helpful for medical terminology, only two of them stated that there is no difference for them. Nevertheless, these students also stressed the essence of visual aids, to be effective.

E.E.: *‘Traditional way is OK for me, but more pictures help me to understand the definitions better’.*

S.S.: *‘Though pictures are helpful for visual-learners, these activities and tasks were helpful for revision and made clear of what we knew or did not know’.*



Figure 2. Terminology Exercise on Language Lab

Kahoot quiz-games

One of the interactive activities implemented in class was through online game called Kahoot (www.kahoot.com). It is a game-based learning platform and has been successfully implemented in schools and educational institutions as educational technology. Kahoot offers a lot of quizzes on medical terminology definitions. These quiz-games were used as revision during the classes. Also, it was a project requirement for students to prepare their own Kahoot quizzes (Figure 3). Hence, one group of students was randomly assigned a particular chapter and prepared online quiz on that medical terminology list (30 questions) supplemented with pictures. After checked by teacher, these quizzes were answered by a whole class. It was expected that this game would facilitate learning medical

terminologies. Students claimed that they motivated and participating in this quiz-game while preparing, sharing and competing with each other when answering it. Moreover, this interaction and preparation helped them to recall the definitions of terms in post-tests.

M.D.: ‘These games helped to better concentrate on and recall the definitions’.

M.B.: ‘These quizzes not just make us only memorize, but understand and internalize’.

A.T.: ‘There are so many terms, but these projects facilitated learning them, and the test became manageable’.

D.Z.: ‘I learnt a lot while preparing my own quiz and answering my friends’ questions too which helped me be successful in test’.



Figure 2. An Example of Kahoot Quiz-Game Prepared by Students

‘Research’ project

As part of the project, the other group was randomly assigned chapters and asked to list affixes/roots and definition of terms (e.g., certain pathology or condition) supplemented with pictures (Figure 4). After checked by the instructor, these projects were also shared in the class for learning and revision purposes.

E.S.: ‘This project was helpful because I did not only learn the words like a robot’.

S.B.: ‘When preparing and finding so many interesting facts made me better memorize the terms. It was interesting to find different diseases related to my chapter’.

S.O.: ‘I was so excited to see our medical terminologies in other sources. I was happy that I recognized these words in tests’.

Y.Y.: ‘It saves time to learn new information from our friends’ projects’.

Term	WPAS	Definition	
Gingivitis	Gingiv/o: gums -itis: inflammation	-a common and mild form of gum disease that causes irritation, redness and swelling of gingiva.	
Nephromegaly	nephr/o: kidney -megaly: enlargement	-enlargement of kidney.	

Figure 3. Student’s Project on Medical Terminology

Research articles

In the other implemented activity, random research papers published by medical doctors in English were chosen. It must be noted that instructor chose these articles with moderate language difficulty, as students at this level found it hard to read articles with difficult language. In these activities, students read introduction and summary parts of articles, found terminologies and checked the meanings. They checked their knowledge of already learned words which was also of a revision and self-assessment character, which was claimed by students to be real and natural.

N.C.: *‘It is important to check terms in papers because it is more real. It is not just a list of words to memorize’.*
 E.B.: *‘It prepares us to faculty classes from another perspective too. Because we will see such papers at faculty lessons’.*
 E.S.: *‘When I read these articles I better understand and try not to forget the words’.*

Results And Discussion

For the purpose of this study, paired-sample t-test was conducted to compare the difference between pre- and post-tests results by using SPSS (Table 1 and Table 2). There was a significant difference in the scores for pre-test 1 (M=8.18, SD=3.9) and post-test 1 (M=24.5, SD=4), $t(27) = -15.7, p < 0.05$; pre-test 2 (M=7.2, SD=3.7) and post-test 2 (M=24.3, SD=4.9), $t(28) = -16.4, p < 0.05$; and pre-test 3 (M=9.5, SD=5.5) and post-test 3 (M=24.8, SD=4.8), $t(26) = -12, p < 0.05$ respectively.

Table 1. Descriptive statistics for pre- and post-tests 1, 2, 3.

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-test 1	8.18	28	3.97	.75
	Post-test 1	24.57	28	4.05	.76
Pair 2	Pre-test 2	7.24	29	3.70	.68
	Post-test 2	24.38	29	4.96	.92
Pair 3	Pre-test 3	9.56	27	5.52	1.06
	Post-test 3	24.85	27	4.87	.93

Table 2. Paired samples t-test for pre- and post-tests 1, 2 and 3.

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
		Lower	Upper	Lower	Upper	Lower			
Pair 1	Pre-test1 Post-test1	-16.39	5.52	1.04	-18.53	-14.25	-15.71	27	.000
Pair 2	Pre-test2 Post-test2	-17.13	5.61	1.04	-19.27	-15.00	-16.43	28	.000
Pair 3	Pre-test3 Post-test3	-15.29	6.58	1.26	-17.90	-12.69	-12.06	26	.000

Hence, it can be claimed that both test results and qualitative data gathered during this study show that the implemented methodology was successful and vocabulary knowledge has developed. Also, as students claimed and as the teacher observed, the activities did not focus on rote memorization, but rather strengthening the memorization of terms by transferring their knowledge to real-life like tasks. Moreover, the methodology did not feature *‘robot-way of learning’*, as stated by one of the students, rather it focused on trying to find solution on how to enable the students to internalize the learned terms. It should also be noted that, as observed and reflected by all students, their prior knowledge on Biology was of great importance to remember some subjects and terms. This appeared to facilitate the process of associating new knowledge with prior knowledge which requires critical skills on students’ parts. Nevertheless, the study bears some drawbacks as well.

Limitations

The study cannot be claimed without its limitations. Given that the methodology implemented for this research focused on enabling the students to internalize the learning process of medical terms, it would be ideal to check to what extent students can recall this vocabulary after some time, i.e., at the faculty. Further follow-up analysis can be carried out with a content teacher as part of adjunct teaching. Moreover, students can be checked to what extent they apply or produce the learned terminology in communication skills in medical context, as this scope bears one of the essential issues for EMP (Wette & Hawken, 2016; Dahm, 2011).

Conclusion And Implications

This study attempted to learn the effectiveness of implemented methodology for teaching and learning medical terminology. Most of the studies have dealt with addressing needs of learners in foreign countries and in Turkey. However, there is a dearth of research on offering pedagogical approach to EMP, particularly to medical terminology knowledge of Turkish L1 speakers. This study can be considered unique as it tried to approach the problem further based on a student-centered approach and suggested pedagogical implementation.

The collected data through pre- and post-tests, students' during- and post-reflection notes, semi-structured interview notes and teacher observations showed that students appeared to be equipped with skills which can also be useful at the faculty. By preparing the projects and applying the learned knowledge into practice, they can be considered to be trained independently which can be called autonomous learning, where teacher played the role of knowledge-transformer, not transmitter. Also, it helped them to think critically and transfer this knowledge into practice which is essential for ESP courses as well (Bahous, 2001). Hence, by applying the learned words to real-life context through projects and interactive techniques, it was found that students can better learn and recall medical words. Besides, it can motivate students, as learning the terminology can be boring, sometimes. In addition to this, this study's methodological approach with transfer skills can also be applied in medical terminology where WPAS technique is impossible to apply for such terms, e.g., *duodenum*, as it was claimed by Taie (2015).

It can also be suggested that similar methodology can be implemented with EFL learners before the mainstream classes. In this context, this class was instructed by the faculty requirement in order to facilitate and familiarize the students with medical terminology before mainstream classes. Similar syllabus can also be applied in other EFL contexts to better prepare the learners with self-confidence and prior knowledge of medical terminology before enrolling at faculty classes. Students and universities can also benefit from such approach, as the number of international students studying at medical faculties is increasing each year. Additionally, gamification-based practices like Kahoot or other projects appeared to enhance the learners' attitudes and motivation towards lessons. Both students' reflections and teacher observation can support it, which are in line with other studies (Yildirim, 2017 and others).

Finally, another important point in EMP context is teaching learners with different or lower language proficiency levels which can make the situation difficult (Eggle, Musial & Smulowitz, 1999; Rivera-Goba & Campinha-Bacote, 2008). Foreseeing this problem, this course was offered in the second semester when learners' language proficiency level was improved up to upper intermediate and a few to advance. Moreover, the ongoing academic and general English courses and pre-content-based English course were facilitating factors in this respect. Therefore, teachers planning to realize such teaching approach should take the learners' language proficiency levels into consideration beforehand.

References

- Alagozlu, N. (1994). *English Language Needs Assessment of the Students of the Medical Faculty of Cumhuriyet University*. Unpublished Master Thesis, Bilkent University.
- Antic, Z. (2007). Forward in Teaching English for Medical Purposes. *Medicine and Biology*, 14(3), p. 141-147.
- Antic, Z. (2009). Towards uniformity in English for medical purpose; evaluation and design. *Language of Medicine*, 137(7-8), p. 454-457.
- Antic, Z. (2010). Analysis of students's errors in English for medical purposes. *Scientific Journal of the Faculty of Medicine in Nis*, 27(3), p. 159-163.
- Bahous, J. (2001). Teach ESP through critical thinking and problem-solving skills. Paper presented at the Meeting of the International Association of Teachers of English as a Foreign Language, Bielefeldm, Germany. Retrieved from <https://eric.ed.gov/?id=ED458801>
- Celik, H., & Topkaya, E.Z. (2018). Professional and personal English language needs analysis of faculty members and postgraduate assistants at faculty of medicine. *Journal of Theory and Practice in Education*, 14(1), 24-35.
- Celik, H. (2017). Perceived language needs of undergraduate medical students enrolled in a consecutively

- running ESP course. *The Journal of Teaching English for Specific and Academic Purposes*, 5(2), p. 209-218.
- Chia, H., Ruth, J., Hui-Lung C., & Floyd, O. (1999). English for college students in Taiwan: A study of perceptions of English needs in a medical context. *English for Specific Purposes*, 18(2), p.107-119.
- Dahm, M.R. (2011). Exploring perception and use of everyday language and medical terminology among international medical graduates in a medical ESP course in Australia. *English for Specific Purposes*, 30(2011), p. 186-197.
- Eggly, S. Musial, J. & Smulowitz, J. (1999). Research and discussion note. The relationship between English language proficiency and success as a medical resident. *English for Specific Purposes*, 18(2), p. 201-208.
- Faraj, B.M.A. (2015). English for medical education in EFL context. *The Journal of Teaching English for Specific and Academic Purposes*, 3(1), p. 121-148.
- Ferguson, G. (2012). English for medical purposes. In B. Paltridge & S. Starfield (Eds.), *The Handbook of English for Specific Purposes* (p. 243-261). Malden MA: J. Wiley & Sons.
- Fremgen, B. F., & Frucht, S. S. (2016). *Medical Terminology. A living Language*. 6th edition. Pearson.
- Hoekje, B.J. (2007). Medical discourse and ESP course for international medical graduates (IMGs). *English for Specific Purposes*, 26(2007), p. 327-343.
- Hwang, Y., & Siouzh, L. (2010). A study of medical students' linguistic needs in Taiwan. *The Asian ESP Journal* 6(1), p. 35-58.
- Hutchinson, T., & Waters, A. (1987). *English for Specific Purposes. A learning centered approach*. Cambridge: CUP.
- Karimkhanlouei, G. (2012). What do medical students need to learn in their English classes: *Journal of Language Teaching and Research*, 3(3), p. 571-577.
- Kayaoglu, M.N., & Akbas, R.D. (2016). An investigation into medical students' English language needs. *Participatory Educational Research*, 2016(1), p. 63-71.
- Labov, J., & Hanau, C. (2005). Effective pedagogy in improving L2 English speaking doctor's pronunciation. Presentation at the Second Language Research Forum (SLRF), 2005, New York.
- Ministry of Health (2012). *Definitions and Descriptions Regarding Health Tourism*, Turkey. Retrieved from: <http://dosyasb.saglik.gov.tr/Eklenti/462,saglikturizmiingwebpdf.pdf>
- Nation, P. (2001). *Learning vocabulary in another language*. Cambridge: CUP.
- Pavel, E. (2014). Teaching English for medical purposes. *Bulletin of the Transylvania University of Braşov*, 7(56), 2.
- Piroozan, A., Boushehri, E., & Fazeli, R. (2016). A review of English for medical purposes for Iranian EFL learners. *Journal of Advances in English*, 4(2), p. 24-29.
- Popa, D. E. (2013). Medical discourse and ESP courses for Romanian nursing undergraduates. *Procedia – Social and Behavioral Sciences*, 83(2013), p. 17-24.
- Rivera-Goba, M. V., & Campinha-Bacote, J. (2008). Making a connection: The use of storytelling as a strategy to enhance faculty's success with Latina nursing students. *Hispanic Health Care International*, 6(4), p. 205-225.
- Taie, M. (2015). Critical thinking and discovering the meaning of unfamiliar terms through the word parts analysis strategy: A study of Iranian medical students. *English for Specific Purposes*, 40(2015), p. 1-10.
- Tasci, C. (2007). *An analysis of Medical Students' English Language Needs*. Unpublished Master Thesis, Bilkent University.
- Wette, R., & Hawken, S.J. (2015). Measuring gains in an EMP course and the perspective of language and medical educators as assessors. *English for Specific Purposes*, 42(2016), p. 38-49.
- Yeniceri, O. (2008). *Needs Assessment of the prep-class students in the Faculty of Medicine at Ondokuz Mayıs University*. Unpublished Master Thesis. Ondokuz Mayıs University.
- Yildirim, I. (2017). The effects of gamification-based teaching practices on student achievement and students' attitudes toward lessons. *Internet and Higher Education*, 33(2017), p. 86-92.
- Zrnkova, P. (2015). The issue of need analysis and assessment of quality in teaching English for medical purposes. *Procedia – Social and Behavioral Sciences*, 174(2015), p. 2995-3004.

Teaching Process Management In Healthcare: Impacting Capacity And Quality Of Care

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Abstract

Medical practitioners admittedly receive little in the way of Operations Management or Process-driven training as part of their education. Here we discuss the impact of those gaps in the form of delayed assessment and treatment, queues and waiting lines, and the opportunities presented in a greater operations focus. Several cases are presented, including the use of medical scribes, specific clinic structures centered on particular patient categories, and the application of 'patient-centric' or customer approaches to healthcare. While typically the quality of the outcome (successful treatment) is viewed as the goal of a healthcare transaction, an operations and process focus not only offers the potential to improve that outcome, but to increase the capacity of the healthcare system and lower overall costs.

Keywords: *Healthcare, Operations Management, Efficiency, Capacity*

Introduction

Wait times are increasing within the healthcare system in Canada, resulting in delayed treatment and potentially adverse outcomes for patients (Barua, Esmail & Jackson, 2014). Since 1990, however, more doctors are being trained and graduated into the system (Canadian Institute for Health Information, 2016), indicating there are larger capacity utilization issues leading to the aforementioned delays and bottlenecks. At the same time, Canada ranks poorly when compared to other OECD countries with respect to the cost and quality of care provided by its healthcare system (Advisory Panel on Healthcare Innovation, 2015)

This paper, presented in a narrative and allegorical format, outlines a number of examples of both current care and opportunities for improvement within the system potentially available through an adjustment to educational and leadership perspectives within the healthcare field. The intended audiences for this research are practitioners and administrators within healthcare and leaders of education in healthcare institutions.

Background

In 2008, Gary experienced severe abdominal pain while on a fishing trip with his grandsons, pain that was bad enough he cut the trip short and went to the hospital. After two days and a series of tests, he was diagnosed with an aortic aneurysm. The cardiologist informed him the aneurysm was not large enough to repair, but they would keep an eye on it, and if it grew to 5mm in size, they would deal with it then. Gary was 68-years-old at the time (Cross & Rowe, 2017).

Six years later, following a series of semi-annual check-ups, the surgeon informed Gary that the aneurysm had reached 5mm in size, basically the point when it was considered risky, so they would schedule him in for surgery as soon as possible. No travelling, no lifting, and take it easy, he was told. Three months later, Gary had not heard anything, so he checked in. The cardiologist's office informed him they had him on the list and he should receive a call soon. After six months, and nine months, same story. Finally, a year after confirming they had to deal with the problem, Gary was brought in for surgery, and an endo-vascular 'Y'-shaped stent was inserted through the top of his legs into his aorta. Capacity issues while he was in the hospital prevented Gary from getting a bed in the surgical recovery area, so he was sent home the next day. Thankfully, Gary recovered fully and completely, and six months later was moving well with no after-effects of either the aneurysm or his surgery.

Let us look at this from a higher level. Perhaps the first five years of Gary's ordeal were not what the medical community would consider urgent. Once the diagnosis had reached 'dangerous', however, Gary's stress level obviously increased, and he worried, 'could this rupture today? Tomorrow? Should we drive to Toronto to see the grandkids? Can we go on that family vacation? Can I shovel the driveway?' Presumably, the aneurism was increasing in size as he continued to wait for surgery. The stress of the situation and indeed, waiting a full year for surgery, may have caused other issues, and reduced Gary's activity level, possibly leading to other long-term health issues or complications. This is a lot of 'could haves' and 'maybes', but studies have connected delays in service to increased impact on patient health (Barua, Esmail & Jackson, 2014).

Many defend the healthcare system in Canada, praising its universal access and quality of care as being world-class and admired by our nation's peers. For all its accolades, and perhaps unfair comparisons to the U.S. healthcare system, Canadian healthcare really does not compare well when ranked against other OECD nations. In one study, Canada ranks 9th of 11 OECD countries in both access to care and quality of care, while spending \$4,522 per capita, compared to the United Kingdom, for example, which ranks 1st of 11 and spends \$3,405 per capita (Advisory Panel on Healthcare Innovation, 2015). We are spending more for slower healthcare in Canada.

It is believed that Canadian medical schools are world class, and graduate superb practitioners at all levels. The authors' own support and treatment from doctors and nurses within the system, though thankfully infrequent, has been wonderful, and any doctor met over the years personally or professionally has been excellent. The issue here isn't the people; it is the process. There is a capacity problem, not unlike what many plants and businesses face, so perhaps we should be turning to some shop floor and business style solutions.

This is not an argument for the generation of more doctors into the system, the equivalent of adding more machines in a production plant, if you will forgive the crude comparison. In fact, over the past 9 years this approach to improve operations has been pursued, resulting in more physicians per person than ever— 228 doctors per 100,000 population (Canadian Institute for Health Information, 2016). While the number of practitioners may remain as part of the capacity issue, the increasing supply points to an alternative constraint. This is a systemic issue - the immediate opportunity within healthcare is in the area of efficiency, process and shop floor style operational excellence.

Research Methodology

Direct interviews and observations (researcher following physicians' rounds) were conducted in healthcare environments with physicians, executives, administrators and patients in different hospital departments. Information and examples were collected across multiple institutions and analyzed for similarities around the premise of operations management exposure within medical education. Questions regarding prior exposure to process and operations management training were not asked until after the initial interviews and observations were completed.

Supporting data was collected through a literature review of publicly available population-wide studies and institution-specific examples. These examples are presented and discussed herein.

Conclusions – The Impact Of An Operations Focus

Here are two premises: First, faster is cheaper. A patient that is processed and treated sooner will consume fewer resources in the healthcare system, where a quicker diagnosis yields earlier and presumably shorter treatment times, a lower burden on system capacity, and reduced public or insurance-supported healthcare spending. For the patients, this means a more complete recovery in many cases, less time off work and therefore less impact on families and employers. None of this is new or surprising, but seldom achieved. Second: Slow is expensive and dead. That is, the reverse of the first point must also be true. Delayed admittance, examination and treatment will consume more resources and capacity, increase the time it takes for recovery to the point of potential long-term or permanent consequences, and have a broader impact on the patient and their family. A 2014 Fraser Institute study of the impact of increasing wait times on women's health found that across 12 major medical specialties, estimated wait times have risen from 9 weeks in 1993 to 18 weeks in 2013. Worse, there is a direct connection between extended wait times and increased patient mortality (Barua, Esmail & Jackson, 2014).

If one applies an efficiency, or even a Lean approach to the problem, what would that mean? Quite simply, it would mean our practitioners and their supporting systems such as scanning and diagnostic equipment would spend less time on non-value-added activities, and more time in the room with patients. Doctors would spend less time with charts, forms and administrative activity, and more time as a practitioner. Machines that are a bottleneck in the system, such

as an x-ray, MRI or CT scan would spend less time sitting idle, where few run 6 or 7 days now (a related constraint here is the technicians and radiologists to operate the equipment).

An important question at this point is, whose job is it to manage operational efficiency in a hospital or clinic? Certainly Administrators are charged with improving costs and capacity utilization in their hospital. Some Masters in Hospital Administration programs include a component or course in Operations Management. Introducing a ‘Lean Initiative’ in a medical facility, however, would likely garner a mixed reaction at best. Past experience has led many to misunderstand what Lean is really about. Lean is not head count reduction. Lean has nothing to do with layoffs and *doing more with less*. Lean is about reallocating resources around the organization in ways that create more value for customers, and in this case, patients.

The deficiency in healthcare education is not complicated – that education is simply missing one key component. In defense of medical practitioners and our medical schools, doctors receive very little exposure or training in the areas of process operations and efficiency. Doctors queried on the subject indicate they may have had a class or two on the subject in third or fourth year, but that is it. Hospital Administration programs offer a bit more in this area, but collectively, hospital and clinic environments are *busy and hectic*, and deal with life-saving situations throughout the day. Justifiably, they are focused on the here and now, and not finding ways to improve the system’s flow.

The purpose of this paper is to advocate for two things: a greater application of process and operations management tools in the interest of increasing capacity in the healthcare system, and longer term, the inclusion of these tools in medical and administrative training. These are simple, straightforward processes that can free up capacity, reduce lead times, and improve the output of healthcare, not only in Canada but any country. Some small component of operations management education and training will do several things within the field that will ultimately drive meaningful improvements in efficient healthcare operations¹. Practitioners and administrators will see their practices and clinics differently, ask questions and consider how to better manage those clinics. Even small increases in education and time spent will facilitate a curiosity and ideally an initiative to facilitate and drive improvement.

Many institutions, in fact, have already begun thinking and working this way. Following are three concrete and varied examples of the application of an operations focus within healthcare, all of which reduced lead-time and the consumption of resources within the system. That is, *patients were treated faster and costs were reduced*. Each example was approached from a different perspective, including the use of an outside consultant, exposure to a solution through a conference attended by a curious physician, and the ability to question why a clinic was managed the way it was.

An Outside Consultant

Virginia Mason Medical Center in Seattle took a hard look at its scheduling and waiting lines roughly 15 years ago. Healthcare is a business, and if queues are too long, patients will eventually go elsewhere, and that clinic gets paid to treat the patient. In 2002, leadership at VMMC worked with Toyota process gurus, both in Japan and back in Seattle, to eliminate their dozens of waiting rooms around the hospital through the creation of more accurate scheduling (e.g. is this a 10- or 20-minute procedure?), process assessment (do we have the tools and information necessary to complete this successfully?) and information technology (digital records and multiple sources of access to that information). Essentially, VMMC changed the way they approach healthcare by transitioning away from batch production methods and into a flow production method from both a patient and provider perspective, not unlike a factory production process. From a patient standpoint, they eliminated batching by removing waiting rooms, assigned patients an electronic tracker with their patient information at check in, and sent patients directly to treatment areas. From a provider perspective, management identified that the key to improving efficiency wasn’t in getting doctors to provide direct patient care faster, it was managing their time when they are not with patients or their *indirect* care time better. They identified that if they could get doctors to complete paperwork and pressing administrative tasks as they encountered them, the system would benefit. Indirect patient care was improved by adding a layer in the process and employing a process specialist called a flow manager. The flow manager prioritizes work for doctors and provides direction as to what indirect care should be completed after leaving direct care and before resuming direct care with another patient. The additional process prevents batching of indirect care, improves the flow of operations, increases the time spent with patients, and reduces the costs to serve patients (Crounse & Pettinger, 2011). This transition from

¹ Healthcare Operations here is considered the overall management of clinical care in a healthcare environment, and not specifically those procedures carried out in a hospital operating room or theatre.

batch to flow modules through process redesign was enabled through an additional element – Information Technology. The IT element gave employees graphical visibility into the location and status of all providers, patients, and equipment. The flow manager could then make informed decisions to prioritize the most pertinent tasks while preserving the flow of the system. While waits decreased, the number of patients processed increased, and VMCC reduced costs by \$12 million over 6 years (Company files, 2017). Subsequent phases of effort continue to reduce or automate the indirect, or less value-added work that still exists within the system.

These improvements are beyond the scope of most basic operations courses, and certainly outside the focus of medical practitioners and administrators. That being said, the process starts with the recognition by hospital leadership that the status quo will no longer serve customer needs, and then their willingness to seek help.

Conference Attendance

Dr. Peter Graves had been an Emergency Room physician for 20 years, and had long appreciated the ability that department offers to tend to acute injury and illness in a hospital space like no other. What he found perpetually frustrating was the length of time patients had to wait for treatment (often measured in hours), and the increasing burden of paperwork associated with patient charting. While attending a medical conference in the United States, he sat in on a presentation on medical scribes. Scribes were people trained to work with physicians while they assessed and treated patients in settings like the ER, and complete patient charts concurrently with the attending physician treating the patient. Graves realized the benefit of the process, and secured approval at Queensway Hospital in Ottawa where he worked to run a trial using medical scribes in their Emergency Room (Cross & Rowe, 2017). Following his trial, the process was then piloted with a number of doctors in the Emergency Room, and has subsequently been rolled out to several other departments in the hospital. In the traditional process, a doctor would take notes and records while with the patient, after wrapping up with a patient, or at the end of a long shift in the ER. Working with a scribe frees up more of their time to practice medicine and create value in the system; doctors dictate their notes and comments to the scribe while working with the patient, and then review, edit and sign the notes once the examination or treatment is finished. The impact and results of this process are numerous: doctors using a scribe report an increase of 30% to 40% in their capacity over a shift, where they may see 30 patients per shift with a scribe versus 21 without (Cross & Rowe, 2017). The quality of care through the process (both perceived and actual) is higher, as a result of the patient receiving the doctor's complete attention while in the room together. Accuracy and detail on the medical records is improved, as the process is done live and concurrently with treatment, rather than after the shift as in many situations. The big win for the hospital and its patient community? Waiting lines are down at Queensway, and revenues are up through increased earnings associated with higher patient flow.

How do we create the most value in our assets? Any plant manager will tell you she wants her machines up and running. An airline only makes money when its planes are in the air, a logistics provider when its trucks, trains or ships are en route, and an oil field service when their rigs are drilling. In this case, doctors create the most value while they are assessing and treating patients, and an MRI machine while it is scanning a patient. Idle time in a hospital is a waste of resources.

The Permission to Question

Mount Sinai Hospital in Toronto recently took a process-centric look at their geriatric care facility, when the director, Dr. Samir Sinha, asked the paradigm-breaking question, 'are we a hotel, or a hospital? We don't get breakfast in bed at home; why should we provide it in a hospital?' Patients in most wards are traditionally given meals in bed, yet we know that prolonged bed rest promotes dysfunction (Grant, 2016). In Sinai's new Acute Care for Elderly (ACE) strategy, patients are encouraged to move around far more often. Seniors are clustered in the ACE ward, where they are provided with non-slip socks, beds are kept at lower heights to reduce falls, and they eat in common areas to encourage socialization and movement. Phones are muted in this non-paging environment. More movement and interaction during the day means the patients are content and sleep better at night. All of this leads to a quicker recovery and discharge for patients, reducing cost of care per patient by 23% and saving the hospital over \$6 million in 2014 (Grant 2016). Early discharge also resulted in more capacity within the ACE ward as well as the indirect benefit of patients spending less time in the hospital with a lesser risk of contracting unrelated infections and diseases. 17 other hospitals and healthcare providers in Canada and Iceland are now applying Sinai's ACE model.

A primary goal of the healthcare institution, its practitioners and administration is to provide quality care for their patients. That is a given. Beyond that, however, workers at all levels need to appreciate their responsibility to question, and realize there are better ways to complete any type of work; we just haven't discovered that improvement yet. This

is the essence of the Toyota Way – *do the work this way, until we figure out a better way to do it. Part of your job is to think about how we can improve things.*

Summary

Canada's healthcare system has issues, but the people are not the problem. Practitioners commit countless hours and tireless energy throughout their training and careers in the interests of a healthier Canada. There are numerous challenges and areas of study and focus within healthcare today, and some are far more complicated than others. As the examples above illustrate, however, there are significant opportunities with small enhancements to healthcare education, potentially leading to significant improvements to capacity utilization and the patient experience with the healthcare system.

References

- Advisory Panel on Healthcare Innovation, (2015) *Unleashing Innovation: Excellent Healthcare for Canada*. Rep. Ottawa: Health Canada, Print.
- Barua, B., Esmail, N., Jackson, T. (2014) *The Effect of Wait Times on Mortality in Canada*, The Fraser Institute
- Cross, B., and Rowe, M. (2017) *The Pace of Canadian Health Care: Lessons from the Shop Floor*, Smith Insight, Select Paragraphs Reprinted with Permission
- Canadian Institute for Health Information (2016) *Physicians in Canada, 2015: Summary Report*. Ottawa, ON: CIHI
- Crouse, W. and Pettinger, K., (2011), *Health Tech Today: Virginia Mason and Versus RTL*. Perf. Health Tech Today. Microsoft, 4 Apr. 2011. Web. <<https://www.youtube.com/watch?v=MobNaBYOGjE>>.
- Grant, K., (2016), *Hospital sets example in caring for seniors*, Globe and Mail, December 23, 2016
- Grant, K.. (2016), *Toronto's Mount Sinai Hospital Sets Example for Caring for Elderly Patients*, The Globe and Mail Health Reporter, 22 Dec. 2016. Web
- Virginia Mason Medical Center, Company Information, (2017) Virginia Mason Production System, Fast Facts, https://www.viriniamason.org/workfiles/pdffiles/press/vmps_fastfacts.pdf

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Technology Integration of Preservice Teachers as Both Teacher and Student

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Abstract

The purpose of the paper was to analyze preservice teachers' development in terms of ISTE Standards for both student and teacher in technology-integrated course named as 'Teaching Principles and Techniques' for third-year teacher candidates. Case study method was implemented, and a survey was arranged by using ISTE standards for both students and teachers. A sample of 95 respondents from the same school and enrolled the same course of the same instructor. The data of the survey were analyzed with SPSS. The results showed that the participants got higher scores as teachers standards than student standards.

Introduction

The way of how people learn and practice are impacted in technology driven world which changes the ways we work, communicate, and live. In response to current needs of the 21st century, learners and educators have confronted with technology in educational environment to learn, use, and produce. International Society for Technology in Education (ISTE) determined the standards for the stakeholders of education to transform teaching and learning (ISTE, 2016). Particularly, the transformation process proceeds with technology integration in teacher education programs. With this transformation, teacher candidates gained the opportunity to develop themselves as a teacher to integrate technology in their future classrooms in addition to empowerment as connected learners and digital citizens. This paper aimed to analyze preservice teachers' development in terms of ISTE Standards for both student and teacher in technology-integrated course named as 'Teaching Principles and Techniques' for third-year teacher candidates.

Context of the Study

The course, implemented in three sessions with the same instructor, was designed as technology- integrated course; in which Edmodo, a learning management system, was the course webpage, projects were needed to use technology to do, and bi-weekly reflections on their development were the assignments. All course requirements were planned to develop the teacher education program to meet ISTE Standards. A survey, as data collection tool, was prepared to measure their development by following both ISTE-S and ISTE-E. In total, 95 preservice teachers were participated in the study at the end of the semester to capture their pure development after the course over. There were 56 women (58,9%) and 39 men (41,4%) all of whom had the average age of 23. Details n demographics of the participants were represented in Table 1.

Table 1.
Demographics of the participants

	Min	Max	Mean	Sd
Age	20	36	23,03	3,164
GPA	1,80	3,70	2,80	0,41
Courses in the Semester	5	18	12,14	3,21
Total Education Courses	3	6	3,56	0,86
Pervious Education Courses	1	2	1,27	0,44

Data Analysis

To analyze data, paired sample t-test, which compares the mean of two matched groups of people or cases, or compares two different mean of a single group (Ross & Wilson, 2017) was employed in IBM SPSS 23. Teacher candidates' perspectives on their technological development as student was categorized as empowered learner, digital citizen, knowledge constructor, innovative designer, computational thinker, creative communicator, and global collaborator. As educators, teacher candidates represented their perspectives on technology in terms of learner, leader, citizen, collaborator, designer, facilitator, and analyst.

Results

Means and standard deviations of these sub-dimensions of ISTE Standards for learners and educators are reported in Table 2.

Table 2.
Mean and Standard Deviation of Sub-scales

	Mean	Sd
<i>Educators</i>		
Empowered Professional		
Learner	3,93	0,76
Leader	4,07	0,75
Citizen	4,07	0,78
<i>Learning Catalyst</i>		
Collaborator	4,02	0,78
Designer	4,06	0,82
Facilitator	3,86	0,76
Analyst	4,16	0,84
<i>Students</i>		
Empowered learner	4,10	0,70
Digital Citizen	4,03	0,79
Knowledge Constructor	4,06	0,84
Innovative Designer	3,89	0,81
Computational Thinker	3,81	0,86
Creative Communicator	3,94	0,87
Global Collaborator	4,01	0,94

The mean scores indicated that the participants highly scored themselves as analyst educators after the course when compared with other standards specified as ISTE-E. On the other hand, the participants indicated their empowered learner characteristic when compared to others in ISTE-S. In order to understand significance of the mean differences between ISTE-E and ISTE-S scores of participants, paired sample t-test was conducted. It revealed no-significant difference between total scores of the standards for learners and educators ($t = -0,94$, $df = 93$, $p < .34$). The non-significant difference indicated that technology integration into the course, which focuses on development of their pedagogical knowledge as teacher candidates, contributed them on both them as learner and their teacher knowledge. Although the aim of the course is to subsidize teacher pedagogy knowledge through technology, they had the opportunity to enhance technology integration knowledge in terms of ISTE standards for educators.

Conclusion

This paper has significance on to explain the teacher education programs on teacher candidates both as teacher and student. While educational institutions were looking for ration implications (Bucci, Cherup, Cunningham, & Petrosino, 2010), such implications' contribution on preservice teachers lead the way to develop teacher education programs. In the field teachers do not use technology effectively because of their lack of education, probably (Kay, 2007; Kim & Baylor, 2008). On the other hand, this study implies that teacher candidates have chance to develop themselves as both future teachers and current students at the teacher education system in Turkey.

References

- Bucci, T. T., Cherup, S., Cunningham, A., & Petrosino, A. J. (2003). ISTE standards in teacher education: A collection of practical examples. *The Teacher Educator*, 39(2), 95-114.
- ISTE (2016). ISTE STANDARDS Education technology standards to transform learning and teaching. Retrieved from: <https://www.iste.org/standards>
- Kay, R. (2007). A formative analysis of how preservice teachers learn to use technology. *Journal of Computer Assisted Learning*, 23(5), 366-383.
- Kim, C., & Baylor, A. L. (2008). A virtual change agent (VCA) to motivate pre-service teachers to integrate technology. *Journal of Educational Technology and Society*, 11(2), 309-321.
- Ross, A., & Willson, V. L. (2017). Paired Samples T-Test. In *Basic and Advanced Statistical Tests* (pp. 17-19). SensePublishers, Rotterdam.

Telling Creative Stories At School: The Complex Knowledge Structure Approach

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Abstract

This paper presents, from both the theoretical and practical points of view, an educational project conducted at the Department of Computer Science, Systems and Communication of the Milano-Bicocca University in collaboration with secondary schools of Milan and its province. The project was devoted involving students to reflect about creativity needed to solve complex problems. Storytelling and case-based reasoning has been adopted, respectively, as the conceptual and computational tools to reach this aim. The CKS-Net framework was used as the didactic platform.

Introduction

Knowledge is an important asset of enterprises and many methodologies have been proposed to acquire and represent experiential knowledge, like CommonKADS (Shreiber, Wielinga, de Hoog, Akkermans, & Van de Velde 1994) and MIKE (Angele & Studer, 1998). Anyway, these methodologies are devoted to manage structured knowledge through the definition of well defined and formalized knowledge models. Unfortunately, there are a lot of fields and problems which cannot be described by standard and general methodologies, since their structures are so complex that it isn't possible to create a model of the involved knowledge.

In this context, a very promising subject of investigation concerns the adoption of Case Based Reasoning (CBR) (Kolodner, 1993) methodology as a very suitable paradigm to deal with complex knowledge structures. It has been applied to many research areas (Muñoz-Avila, Gupta, Aha, & Nau, 2002; Watson, 2002b, 2002a) and it results to be the most natural approach for many research projects characterized by episodic knowledge, since it allows to find a solution to a new problem (i.e. the *case*) by the adaptation of solutions adopted in the past to solve the most similar problems to the current one.

The key aspects of a Case Based application are the *structure of the case* and the *nature of the similarity* among cases. The structure of the case must define what kind of attributes has to be adopted to describe problems, in order to allow the comparison among them. The nature of the similarity must define a criterion, that can be a function (i.e. similarity function) or something more complex like a similarity metric (Finnie & Sun, 2002), to compare cases according to their attributes, in order to determine what are the most similar past problems to the current one.

The definition of case structure and similarity function is rather simple when the examined domains are characterized by well defined knowledge: in such situations, the classical K-Nearest Neighbor based on the Euclidean Distance is sufficient to compare cases having a fixed and unchangeable structure. Unfortunately, there exist a lot of situations in which the structure of the case is not unique, since it depends on the context in which it is analyzed and more sophisticated similarity metrics than the K-Nearest Neighbor algorithm could be necessary to compare them. The aim of the paper is to describe a conceptual and computational framework for the management of collective creativity in decision-making processes, that cannot always be captured exploiting traditional methodologies for the development of knowledge-based systems. Such knowledge typically concerns informal groups of people working and living within organizations, called Communities of Practice (CoPs) (Wenger, 1998) as well as organizations with a low level of technicality, like e.g. Small and Medium enterprises (SME).

Given the importance of SMEs in the global economy, especially in Europe, there has been a great deal of research in the Knowledge Management (KM) context, both from the theoretical and the practical standpoint to support SMEs in their day to day activities and to join SME networks. The main KM issues that have been recognized for SMEs are:

- their significant technological gaps with respect to wider organizations. Several technological solutions have been proposed in KM literature to enhance networking and knowledge sharing within

collaborative communities (see KNOW-CONSTRUCT project (Soares, Simões, Silva, & Madureira, 2006) as an example);

- their vulnerability in terms of loss of key personnel, as a consequence of their small size (Handzic, 2004). The limited dimensions of SMEs, that undoubtedly is a benefit from the agility perspective, may in fact cause the lack of a shared structured framework for company experiential knowledge collection and management.

In this paper we mainly refer to the latter issue and we present *Complex Knowledge Structures (CKS)*, a framework for the representation and management of creativity based on the integration of storytelling (Atkinson, 1998) and Case Based Reasoning methodologies. Storytelling is a short narration through which an individual describes an experience on a specific theme (Bruner, 1991). Storytelling can be considered an effective way to capitalize the knowledge that is produced from the daily working activities within organizations (Kleiner & Roth, 1997). Knowledge Management can profitably exploit storytelling as a way to make explicit the individual experiences, skills and competencies, to promote the negotiation processes through dialogues among people involved, to support the reification of new knowledge in order to make it available for the future and to help newcomers in the learning process about his/her job through the analysis of the problem-solving strategies and social context represented by the stories. In order to improve knowledge formalization and sharing within SMEs, CKS models problem-solving situations, solutions and outcomes into a CKS-Base that can be incrementally enriched with new experiences and managed according to a CBR strategy.

As an example of CKS application, we present here a Work Experience Scheme Project conducted at the Department of Computer Science, Systems and Communication of the University of Milan Bicocca in collaboration with many secondary schools of Milan and its province. The project, called “Let’s cook with the case based reasoning”, aimed at enabling students to involve students in understanding how creativity can be computationally captured (Gervais, 2009) through the storytelling conceptual paradigm. The students were invited to reflect on and solve a concrete problem, quite easily understandable by them given their age and skills: how to organize a dinner tackling in a creative way possible critical situations, like the lack of an fundamental ingredient, the disposition of people around the table, and so on.

Methodology

The Report to UNESCO by International Commission on Education (Delors, 1996) emphasises the role of learning in the new millennium. Learning in this sense means resource, possibility for every human being to realise itself, and not only compulsory education, training, acquisition of competencies, expertise, abilities or skills. Today learning throughout life is a necessity for individuals to participate in the knowledge society and economy, it’s a fundamental strategy. Adult Education asserts as a new man’s right, it finds its fundament and its aim in acknowledging value of every person to whom it must be warranted the opportunity to properly express itself along the life-span development.

This perspective of education as a life long process upsets time and modality of learning: All people can be protagonist of their own life, choices and iter. In this sense the main purpose of educational processes is the promotion of person’s integral health, in all contexts in which he/she lives: In the family, at work, in the local community. A democratic development of every Country would be possible only if education will be a right -not a privilege- during the whole life span development (Alberici, 1998). All people should have opportunity to know their own capabilities and best exploit them. It’s necessary to enable adults to become actors of their own development throughout life (Lengrand, 1970), resources for their own life project and for community.

Contemporary socio-cultural context supports the idea of knowledge acquisition and management, not only as development of Organisation, policy, methods of knowledge diffusion, but also as a community’s benefit. Starting from these considerations, we reflect about the concept of continuous learning within organizations and how to support it. In particular, we focus the attention on learning by doing paradigm.

Learning by Doing is based on well known psycho-pedagogical theories, like cognitivism and behaviourism, which are devoted to point out the role of practice in humans’ intellectual growth and knowledge improvement. In particular, this kind of learning methodology refuses the typical idea that concepts are more fundamental than experience and, consequently, that only a solid set of theoretical notions allows to accomplish a given task in a complete and correct way. Learning by doing methodology states that the learning process is the result of a continuous interaction between theory and practice, between experimental periods and theoretical elaboration moments. Learning by doing can be articulated into four distinct steps (Figure 1), where practical phases (i.e. *Concrete Experience* and *Experimentation*) are alternated with theoretical ones (i.e. *Observation and Reflection* and *Creation of Abstract Concepts*): starting from some kind of experience, this experience originates a mind activity that aims to understand the phenomenon; this step ends when a relation between the experience and its

results (typically a cause-effect relation) is discovered that can be generalized to a category of experiences similar to the observed phenomenon. The result is a learned lesson that is applicable to new situations which will eventually occur in the future.

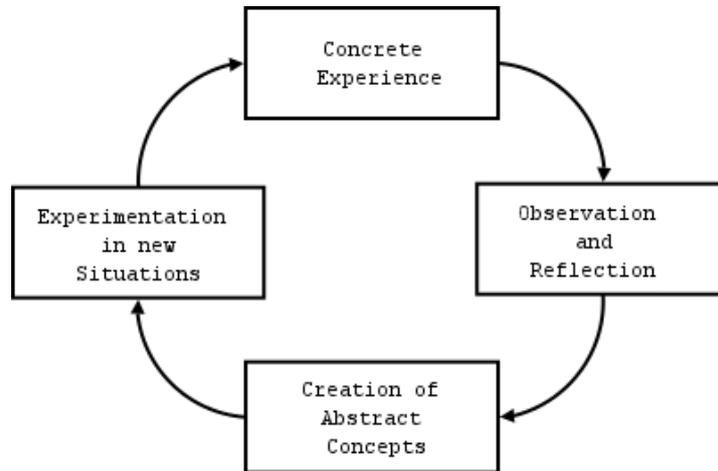


Figure 1: the four steps in learning by doing

In our framework, a *concrete experience* can be represented by a story, which represents a decision making process about a problem to be solved. This story should give to a newcomer an idea of how a critical situation could be tackled, according to the knowledge owned by experts. Moreover, it could give indications about who could help him/her in case of need.

Stories can be archived as cases according to the case-based reasoning (CBR) paradigm. Case Based Reasoning is an Artificial Intelligence method to design knowledge management systems, which is based on the principle that “similar problems have similar solutions”. For this reason, a case based system doesn’t require a complete and consistent knowledge model to work, since its effectiveness in finding a good problem solving strategy depends typically on how a problem is described. Thus, CBR is particularly suitable to adopt when domains to tackle are characterized by episodic knowledge and it has been widely used in the past to build decision support systems in domain like finance (Sartori et al, 2016), weather forecasting (Hansen and Riordan, 2001), traffic control (Gomide and Nakamiti, 1996), and so on.

A case, as shown in Figure 2, is a complete representation of a complex problem and it is generally made of three components: *description*, *solution* and *outcome* (Kolodner, 1993). The main aim of CBR is finding solutions to new problems through the comparison of it with similar problems solved in the past, as shown in Figure 3, which represents the well known 4R’s cycle by Aamodt and Plaza (2004): the comparison is made according to a retrieval algorithm working on problem features specified in the *description* component. When an old problem similar to the current one is *retrieved*, its solution is *reused* as a solving method for the new problem. The solution can be then *revised* in order to fit completely the new problem description and finally *retained* in the case base to become a sort of new lesson learned. In the retained case, the outcome component gives an evaluation about the effectiveness of the proposed solution in solving the problem. In this way, new cases (i.e. stories) can be continuously created and stored to be used in the future, building up a memory of all experiences that can be used as newcomer training tool.

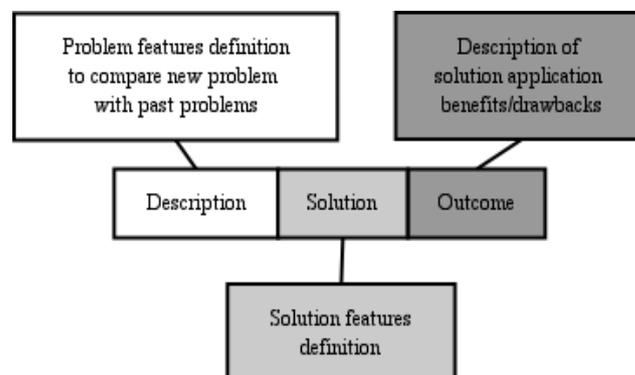


Figure 2: Case structure

Starting from concrete experiences newcomers can learn decision making processes adopted within the organization they are introducing quicker than studying manuals or attending courses. Moreover, the comparison between their own problem solving strategy and the organization one, represented by the collection of stories, stimulates the generalization of problems and consequently the reflection about general problem solving methods, possibly reducing the time period to make the newcomers able to find effective solutions.

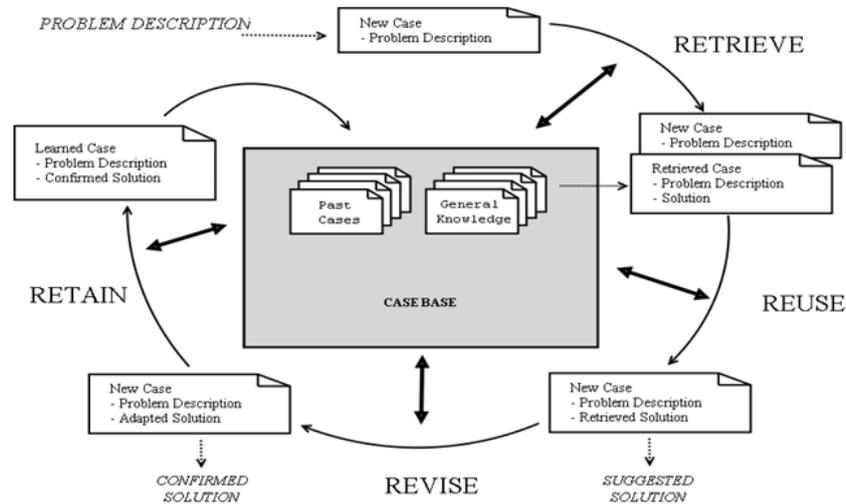


Figure 3: The 4R's cycle for CBR system development

CBR is one of the most suitable Artificial Intelligence methods to deal with learning by doing (Sartori et al, 2010), due to the perfect match between their cycles of life. In particular:

- The *description of a new case* can be a way to represent *experimentation in new situations*, since the aim of CBR is to solve a new problem exploiting old solutions to similar problems. Thus, a new case is the attempt to apply past experiences to a new concrete situation in order to validate a problem solving strategy, as the experimentation in new situations is a way in the learning by doing context to test the generation of abstract concepts starting from already validated concrete experiences;
- A retrieved case in the case base represents a concrete experience in the learning by doing framework;
- Retrieval, reuse and revise are the CBR phases during which a solution to a new problem is found and reused by comparison with similar past problems and then adapted to fit completely the critical situation defined by problem description. Thus, they can be exploited to model the theoretical steps of learning by doing methodology (i.e. Observation/Reflection and Creation of abstract concepts), through which a newcomer finds a general way to tackle a problem starting from a set of existing examples;
- Finally, the retained case in the CBR paradigm is the completion of the initial problem to be solved with the optimal solution obtained at the end of the CBR cycle, thus it represents a new instance of the initial experimentation in new situations.

Moreover, since the concept of story can be used to describe both a case in the CBR paradigm and a concrete experience in the learning by doing methodology, in our opinion, storytelling is the optimal connection between a case-based support to the development of training systems for newcomers and the learning by doing context.

Creative Stories In The Cbr Paradigm: The Cks-Net Framework

Robert E. Franken (2007) defines creativity as “*the tendency to generate or recognize ideas, alternatives, or possibilities that may be useful in solving problems, communicating with others, and entertaining ourselves and others*. People become creative due to their needs to tackle new, modified or complex situation, to communicate ideas and values or solving problems. Franken argues that creativity arises from the capability to think in a different way with respect to the common sense, being able to generate new possibilities and/or alternatives.

For Robert W. Weisberg (2010), the word *creative* can be referred to both novel products of value and the person(s) working on it, focusing on the fact that the novelty of a product is necessary but not sufficient to state it is creative too, since it must also have value or be appropriate to the cognitive demands of the situation.

A very detailed analysis of creativity and creative people comes from Psychology. For example, Mihaly Csikszentmihalyi (1997) observes that the term creativity is very often associated to people who think unusually, being interesting and stimulating for other groups of persons as well as people who study the world in novel and original ways or individuals capable to produce important changes in our culture. According to the concepts above,

Csikszentmihalyi defines creativity “*any act, idea, or product that changes an existing domain, or that transforms an existing domain into a new one [...] What counts is whether the novelty he or she produces is accepted for inclusion in the domain.*”

An interesting point of view is offered by Linda Naimann¹, who distinguishes between imagination and creativity: “*I define creativity as the act of turning new and imaginative ideas into reality. Creativity involves two processes: thinking, then producing. Innovation is the production or implementation of an idea. If you have ideas, but don’t act on them, you are imaginative but not creative.* According to this definition, creativity is strictly related to innovation, defined as² “*using new ideas or applying current thinking in fundamentally different ways that result in significant change.*”

The last definition is very close to how Knowledge Management has interpreted the term creativity; in a fundamental paper David Gurteen (1998) gives very clear definitions of knowledge, creativity, innovation and the relationship existing among them through the discipline of Knowledge Management: “*Creativity and innovation concern the process of creating and applying new knowledge. [...] Knowledge Management, however, is a new discipline and creativity and innovation need to be thought about in this new context.*”. As Linda Naimann, Gurteen says that creativity and innovation are complementary: the generation of new ideas (i.e. creativity) needs a way to put them into action (i.e. innovation). On the other hand, no innovation is possible without the existence of an idea. As a consequence, existing knowledge is required to start the process (i.e. how is it possible to put into action an idea?) as well as the generation of new knowledge as the process output (i.e. what is the result of an idea application to a given context?). From the conceptual perspective, *dialogue* is indicated as the most suitable paradigm to take care of creativity in the Knowledge Management area: “*In dialogue you prefer a certain position but do not cling to it. You are ready to listen to others. Your mindset is one not of ‘convincing others that your way is right’, but of asking what can I learn from others.*” As a consequence, the natural technological support for this kind of creativity management is the adoption of *groupware* approach: “*Groupware is coming of age with the advent of INet technologies [...] and its groupware – the bringing of people together across time and space – that combined with new ways of thinking is transforming the way that we work.*”

From the conceptual point of view, *storytelling* has been universally recognized as a very good starting point. As reported by S. Denning (2011), storytelling build trust, unlock passion, overcomes hierarchies due to its intrinsically collaborative nature and its capability to flatten the communication among people (or communities). A story is a narrative account of a real or imagined event or events. Within the storytelling community, a story is more generally agreed to be a specific structure of narrative with a specific style and set of characters and which includes a sense of completeness. Through this sharing of experience stories allow to pass on accumulated wisdom, beliefs, and values. Stories explain how things are, why they are, and the different roles and purposes involved. Stories are the building blocks of knowledge, the foundation of memory and learning. In the Knowledge Management literature (Bhardwaj & Monin, 2006), stories are often considered as very profitable tools to make explicit tacit knowledge, with the possibility to exploit them in the process of generating collective creativity from individual creativity.

From the computational point of view *Case Based Reasoning* is one of the most suitable paradigm to deal with creativity (Sartori, 2017). As reported above, the relationship between storytelling and CBR has been already analyzed in the past: in this approach, the story is the conceptual tool through which a tacit knowledge frame, for example a portion of a problem solving strategy, is made explicit.

As pointed out in the previous section, this schema perfectly fits the 4R’s cycle for the development of CBR applications: the case structure can be adopted as an approximation of a story representing the narration of a complete problem solving strategy adopted by an individual during an innovative solution generation; the collection of all the cases produced by an organization, i.e. the *case base*, can be thought as an approximation of all the stories produced by their members in their problem solving activities.

The CKS-Net framework has been designed and implemented according to the following principles:

- creativity is the result of a negotiation process inside a community of people. This community is composed by experts and users interested in their capability to solve a problem. The community lives for a short period of time, starting when a problem arises and finishing when a solution to the problem is found;
- the negotiation process must be represented as story, clearly identifying the problem, the solution adopted and the benefits or drawbacks obtained by the application of the solution;
- the case structure defined to computationally describe the story must be variable according to the different perspectives under which a problem can be considered;
- the similarity measure to compare stories should work on heterogeneous case structures.

¹ Available <https://www.creativityatwork.com/2014/02/17/what-is-creativity/>, last access 2018/08/20

² Definition from the IBM Global Innovation Study, 2006

To take care of the points above in the design of a case-based application is not trivial; one of the principles of the CBR approach is that *similar problems have similar solutions* if the problems are characterized by *homogeneous* descriptions. This principle cannot be completely satisfied in the design of a framework for supporting innovation: an innovative solution to a problem could be derived from different contexts, according to the heterogeneous nature of the fields the community members come from. The structure chosen for representing problems in CKS-Net is the graphical one. As a consequence, the retrieval algorithm must be properly thought, in order to give plausible results in the comparison of problems.

The design phase of the framework for the management of creative stories has started with the analysis of the nature of the knowledge involved: *know-how* knowledge, related to the way a community solves a problem, and *social* knowledge, related to the communications among the members of the community involved in the problem solution. Both of them should be potentially considered in the case structure. Moreover, the problem solving activity should be viewed as a sort of bridge between the description of the problem and the reasons why solving that problem is crucial. The result of the analysis has been the definition of the *Complex Knowledge Structure* (CKS) as a mean to acquire and represent in a uniform fashion both the experiential and social knowledge involved in a problem solving process.

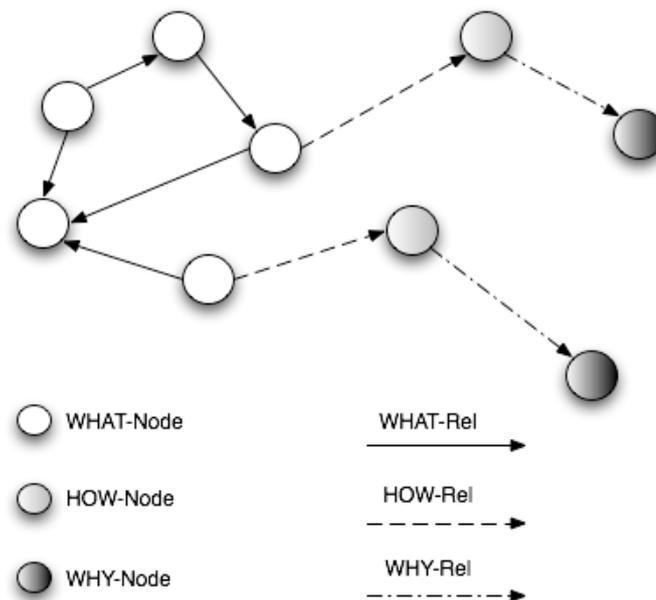


Figure 4: Graphical representation of Complex Knowledge Structures (CKS)

In this sense, a Complex Knowledge Structure can be considered as a mean to describe the narration of a story represented by a problem solving process. CKSs are represented by means of *graphs* (see **Figure 4**), whose *nodes* represent entities involved in problem solving process and are bounded by direct and labelled edges (each edge is an instance of a relationship holding between two entities). Further details about the CKS-Net framework are out of the paper scope: they can be found in (Sartori, 2017).

Case Study

In this paper, we present a Work Experience Scheme Project conducted at the Department of Computer Science, Systems and Communication of the University of Milan Bicocca in collaboration with many secondary schools of Milan and its province. The project, called *Let's cook with the case based reasoning*, aimed at enabling students to reflect about solving complex problems in a creative way. Ten students attending the last two years of the secondary schools were involved in the project, selected on the basis of their motivations. They were invited to discuss about a typical configuration problem in the CBR domain, the definition of lunch or dinner. This problem can be tackled from different points of view, ranging from the meal preparation to the disposition of invited people around the table. In particular, we have focused on the meal preparation: a group of three students worked on appetizers, a group of three students worked on main courses and the last group of four students worked on desserts. First of all, they build up a case base of recipes from opportune knowledge sources, like cooking books and internet blogs: at the end of this step, we obtain a collection of 236 solved cases (105 appetizer, 115 main courses and 116 desserts).

Then, they were answered to think about possible classes of problems that needed a creative solution: to this scope, they tried to retrieve knowledge from the same knowledge sources. They were able to find two main classes of problems:

- the lack of one or more ingredients and their substitution with others to preserve final meal characteristics (e.g. pleasant taste);
- the attempt to modify the recipe to obtain new characteristics of the final meal;

The students formalized such problems as 89 new cases without solution.

Then CKS-Net was asked to find solution to solve the problems, looking for similar problems in the case base and exploiting past solution to derive new ones.

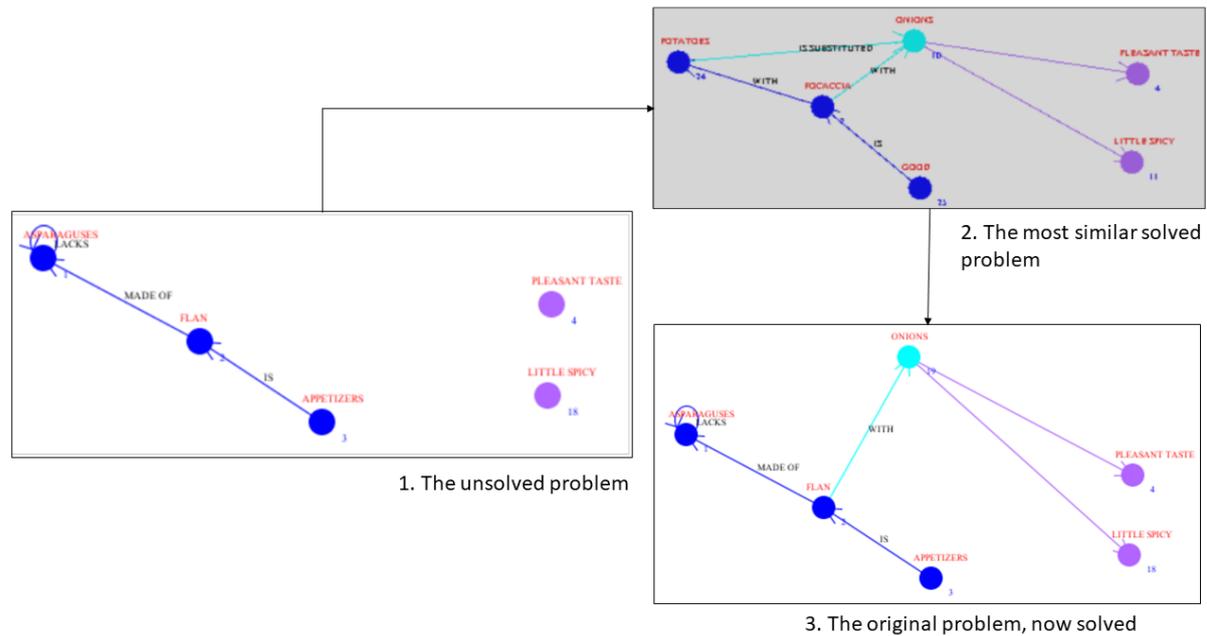


Figure 5: An example of story in CKS-Net

As an example, Figure 5 shows a story about the solution of a missing ingredient in an appetizers, that is and asparagus flan. The problem concerns (step 1. In the figure) the lack of asparagus, and the user must replace them in order to preserve *pleasant taste* and *little spicy* characteristics of the original recipe. The CKS-Net system retrieve the most similar past problem form the case base (step 2. In the figure): the interesting point is that such case represents a *main course*, that is a *potatoes focaccia*. Anyway, the system was able to recognize that the problem represented by it was similar to the current one; in particular, the lack of potatoes with the necessity to substitute them with another ingredient capable to preserve the pleasant taste and little spicy features. Thus, the system reuses the solution adopted in the past to suggest the replacement of asparagus with *onions*. In this sense, and according to the definitions of creativity given above, the story depicted in the figure can be defined a *creative solution to a complex problem*.

At the end of the project, 69 of the initial 89 problem were solved in a good way, for a total 77.5 % percentage of success; the students declared their full interest in the project and they stated their availability for repeating the experience at a deeper level.

Conclusions

This paper has presented a framework to support learning by doing and creativity within different kinds of groups, like communities of practice or more formal knowledge structures acting in SMEs or wider organizations; this framework is based on the integration of storytelling and case based reasoning methodologies. Storytelling has been chosen due to its capability of taking care of different kinds of knowledge in the description of working experiences and presenting important pieces of expertise to newcomers in wide organizations.

On the other hand, case based reasoning is one of the most suitable Artificial Intelligence paradigms to deal with episodic and heterogeneous knowledge and consequently, in our opinion, it is probably the best approach to manage unstructured narrations about expertise and problem solving strategies. In order to test the effectiveness of our approach, its application in the context of the *Let's cook with case based reasoning* educational project has been briefly introduced: the project has confirmed the capability of our approach to find innovative solutions in

creative contexts and suggested the future works, in particular the integration of CKS-Net in the KAFKA framework (Sartori and Melen, 2017) for the development of a complete environment to support knowledge engineering in complex domains.

References

- Aamodt, A., & Plaza, E. (1994, March). Case-based reasoning: Foundational issues, methodological variations, and system approaches. *AI Communications*, 7(1), 39–59.
- Alberici, A. (1998). Towards the Learning Society: an Italian perspective. In: Holford J., Jarvis P., Colin G., International Perspective On Lifelong Learning. London: Kogan Page Press.
- Atkinson, R., (1998). The Life Story Interview, Sage University Papers Series on Qualitative Research Methods, vol. 44, SAGE Publications, Thousand Oaks, CA.
- Bhardwaj M. Monin J. (2006). Tacit to explicit: an interplay shaping organization knowledge. *Journal of Knowledge Management*, 10(3), 72–85. 10.1108/13673270610670867
- Bruner, J. (1991). The narrative construction of reality. *Critical Inquiry*, 18, 1–21.
- Csikszentmihályi M. (1997). Creativity: flow and the psychology of discovery and invention. New York, NY: Harper Perennial.
- Denning S. (2011). The leader’s guide to storytelling: Mastering the art and discipline of business narrative. New York, NY: John Wiley & Sons.
- Delors, J., et al. (1996). *Learning: the Treasure within*, International Commission on Education for the 21st Century report to UNESCO. Paris: UNESCO Press.
- Finnie, G., & Sun, Z. (2002). Similarity and metrics in case-based reasoning. *International Journal on Intelligent Systems*, 17(3), 273–285.
- Franken, R. E. (2007). *Human motivation*. Thomson/Wadsworth.
- Gervás, P. (2009). Computational approaches to storytelling and creativity. *AI Magazine*, 30(3), 49. Cazden, C. (1986). Classroom discourse. In M.C. Wittrock (Ed.), *Handbook of research on teaching* (pp.432-463). NY:MacMillan.
- Gomide, F., Nakamiti, G. (1996) *Fuzzy Sets in Distributed Traffic Control*, 5th IEEE International Conference on Fuzzy Systems - FUZZ-IEEE 96, pp 1617-1623, New Orleans - LA - EUA.
- Gurteen D. (1998). Knowledge management and creativity. *Journal of Knowledge Management*, 9(5), 97–107.
- Handzic, M. (2004). Knowledge management in smes-practical guidelines. *CACCI*, 1, 1–11.
- Hansen, B.K., Riordan, D. (2001) *Weather Prediction Using Case-Based Reasoning and Fuzzy Set Theory*, Workshop on Soft Computing in Case-Based Reasoning, 4th International Conference on Case-Based Reasoning (ICCBRO1), Vancouver.
- J. Angele, D. L., D. Fensel, & Studer, R. (1998, October). Developing knowledge-based systems with mike. *Automated Software Engineering*, 5(4), 389–418.
- Kleiner, A., & Roth, G. (1997). How to make experience your company’s best teacher. *Harvard Business Review*, 75(5), 172.
- Kolodner, J. (1993). *Case-base reasoning*. 2929 Campus Drive, Suite 260, San Mateo CA 94403: Morgan Kaufmann Publisher, Inc.
- Lengrand, P. (1970). *Introduction à l’éducation permanente*. Paris: UNESCO Press.
- Muñoz-Avila, H., Gupta, K., Aha, D. W., & Nau, D. S. (2002). Knowledge-Based Project Planning. *IJCAI Workshop on Knowledge Management and Organizational Memories*. Kluwer Academic Publishers. Retrieved from <http://www.cs.umd.edu/~nau/papers/IJCAI-KM-2001.pdf>
- Sartori, F., Bandini, S., Petraglia, F., & Svensson, J. (2010). A conceptual and computational approach to support learning and education in wide organisations. *International Journal of Entrepreneurship and Innovation Management*, 11(3), 341-355.
- Sartori, F., Mazzucchelli, A., & Di Gregorio, A. (2016). Bankruptcy forecasting using case-based reasoning: The CRePERIE approach. *Expert Systems with Applications*, 64, 400-411.
- Sartori, F. (2017). What about virtual creative knowledge environments? Definition and modelling through case-based reasoning. *International Journal of Metadata, Semantics and Ontologies*, 12(2-3), 110-123.
- Sartori, F., Melen, R. (2017). Teaching expert systems development with Kafka. *Turkish Online Journal of Educational Technology*, (Special Issue 2017), pp. 20-28.
- Schreiber, G., Wielinga, B. J., de Hoog, R., Akkermans, H., & Van de Velde, W. (1994) CommonKADS: A Comprehensive Methodology for KBS Development. *IEEE Expert* 9(6): 28-37
- Soares, A. L., Simões, D., Silva, M., & Madureira, R. (2006). Developing enterprise sponsored virtual communities: The case of a sme’s knowledge community. In R. Meersman, Z. Tari, & P. Herrero (Eds.), *Otm workshops (1)* (Vol. 4277, p. 269-278). Springer.
- Watson, I. (2002a). Applying knowledge management: Techniques for building organizational memories. In *Advances in case based reasoning, Inai 2416*. Berlin: Springer Verlag.
- Watson, I. (2002b). A knowledge management initiative by uk local government. In *Knowledge management and*

organizational memories. Kluwer Academic Publisher.

Weisberg R. W. (2010). The study of creativity: from genius to cognitive science. *International Journal of Cultural Policy*, 6(3), 235–253. 10.1080/10286630903111639

Wenger, E. (1998). *Community of practice: Learning, meaning and identity*. Cambridge, MA: Cambridge University Press.

The Analysis Of The Target Audience Having A Part In The Success Of An Advertising Campaign In Terms Of Their Demographic Characteristics

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Abstract

As the successful elements of an advertising campaign are taken into account, it is different from similar campaigns and has the purpose of convincing the target audience to buy that product or service. For this reason, the advertiser has to follow a process that involves striking and interesting work on a certain topic at a certain time. In this context, a successful advertising campaign in this process emerges as a result of a realistic evaluation and identification of the demographic characteristics of the target group. This study involves explaining the demographic characteristics (such as age, education, gender, place of residence, occupation, income and marital status) that are vital in defining the overall profile of the target group, which are effective in the emergence of a successful advertising campaign.

Keywords: *Target Audience, Advertising Campaign, Demographic Characteristics*

Introduction

With the emergence of the mass phenomenon of communication, the rapidity of the transmission of the message to as many persons as possible has brought about the time and space that triggered great transformations in cultural structures. The fact that massive communications are open, independent of each other, have begun to affect their level of knowledge, attitudes and attitudes (Aziz, 1982: 48). The concept of mass communication, which is the "mass communication" in English, emerges as a process in which, in the first place, antisocial social groups or individuals try to convey or convey symbolic contents to other people. Among the most important factors of this process are the fact that other people who constitute the mass have different characteristics from the ones that constitute the symbolic contents and the other is the use of technical tools in reaching the contents (Gökçe, 1993:81). The transformation that mass media has experienced in today's world, also called Network Society or Post-Industrial Society; have created significant differences in the mechanism of operation of these vehicles from the past. As a result of developments in Internet technologies and leaps in mobile technology, people are now able to communicate with each other on social networks online 24 hours a day and exist in new public spaces where they can interact and interact. As a result of the changes and transformations that technological developments cause in daily life practices, the main difference between the new mass communication channels that are developing alternatively or in parallel; all users can produce content independent of content providers and have reached the capacity to publish this content. The conceptual framework drawn by Laswell (Mutlu, 2008:178), which introduced the concept in the 1940s, is that the prominent discussion areas of mass communication in academic meetings held in the 1970s (Alemdar and Kaya, 1983:15) seen. After the periods when the owners of media tools have discussed the dimension of the capacity to establish cultural hegemony or the existence of large institutions that are necessary for content production, social networking is now the most penetrated penetration of society as a whole; the right to create content derives from the monopoly of media ownership and democratization as all the individuals have reached this capacity.

Advertising derived from the word "clamare" meaning "to call" in Latin; is generally defined as the act of promoting and adopting the people, institutions, products and services to the target group. (Karpaz, 1999: 35). Advertising is the most controversial item on marketing communication. With the development of marketing, products, services, individuals and ideas are also considered within the scope of marketing, and the focus areas of advertisements are enlarged in this way. (Odabaşı and Oyman, 2002: 95) In the marketing process, advertising is accepted as part of mass communication in terms of communication. When considered by communication as an instrument of information and persuasion, It is also used to advertise a product or service in large quantities. (Gürüz, 1999: 20). Thus, it is ensured that the product or service is announced to the target masses determined by the mass media, and attitudes and behaviors are made in the desired direction.

Social responsibility campaigns can be defined as a strategic positioning and marketing tool in which various agencies use an agency or individual to connect to a related social purpose or problem within a certain period, period and movement plan to provide mutual benefits (Elden, 2009:302). Institutions contribute to a specific problem with social responsibility campaigns; At the same time, consumers have the opportunity to find an emotional connection with the media and find a place in the media. Long-term and successful campaigns; the institution is able to be news in the media and increases the likelihood of institutions in the consumer's eyes. Being news in the media about a social

campaign will attract even those who are opposed to the ad; they can create positive judgments in the minds of the institution indirectly. (Karahan, 2006: 62).

The person intended to reach the message in the communication process is one of the basic components of the target communication process, defined as a cluster or a mass. Through the mass communication, the target can be expanded from person to mass; (Mutlu, 2008: 126), which defines specific audience segments and has the definition of reaching them with the most effective channel available.

The success of an advertising campaign is assessed based on whether it can convince the target mass to meet its campaign objectives. If the advertising campaign can create a positive attitude towards the product or service on the target audience, it means fulfilling the advertising campaign objectives if it can increase the awareness or recall of that product or service. In order to achieve this, the demographic factors including age, gender, place of residence, occupation, income and marital status, which help to segment the target population according to certain numerical and livelihood characteristics, need to be recognized in the context of the basic characteristics of the target population.

Demographic Characteristics And Samples Of Target Audience

Age is creating differences in Consumer's age group consumption behavior. For example, young age group clothes, cassette, cd products, middle age group, household goods, etc. products (Gürüz, 1999: 87). In this context, advertisers should set up advertising strategies by taking into account the age range of the target masses they are aiming to call, and identify the advertising content accordingly. The perspective of the target group that sees associations of its own age group in an advertisement for a product or service will therefore also differ in its perspective and hence in its buying behavior (Elden et al., 2008:105). A consumer in the 15-20 age group tries to follow the fashion while choosing products such as clothing, plaque, and magazines. In this way age groups are important in determining consumer characteristics due to the needs and desires of different products at different ages (Yaylacı, 1999:133). In this context, advertisers should set up advertising strategies by taking into account the age range of the objects they are aiming to call, and determine the advertising content accordingly.

In an ad for a product that one child will use, attention will be drawn to the target item, and cartoon characters, animations, or the use of real animated children as protagonists will draw attention to the child's product (Elden, 2009: 369). For example; In the Pınar Kido Fruity Milk advertisement, an advertisement consisting entirely of cartoon characters was prepared and the advertisement was animated with a clown to attract children easily.

Likewise, advertisements in which the character of Lion King Max, identified with the product by Max freezes and helping children in difficult situations, play a role in real life children in the foreground can be given as examples of advertisements prepared for children. As can be seen from the examples above, these images used in advertising campaigns show that the success of the campaign for the age factor is significant at the point of describing and attracting interest.

Like age, it plays a very important role both in the purchase decision and in **gender** differences in the choice of product or service and brand. Some products or services are directed towards women by some products or services to men. Again, while men are more decisive in the purchase of certain products or services, women have a say in the purchase decision of some products or services. For this reason, it must be determined which product or service the product or service is intended for and what the gender of the person making the decision to purchase the product or service is (Kocabaş and Elden, 2006: 60).

For example; Orkid Alldays is directly proportional to the gender factor due to the fact that the target audience for the product of the use of a woman figurine (mother, business woman, friend, etc.) who wear different collective roles in social life.

It is also possible to find advertisements in which some women's products are included as final decision makers. For example; Gillette's shaver is shown as a woman who tests and certifies the utility of the product. As can be seen from the above examples, the gender roles used in advertising campaigns indicate that the success of the advertising campaign is important in terms of defining the target audience.

Another factor that has a significant effect on the buying behavior of the target group is the **marital status** of the group in which the advertisement is voiced. The marital status also increases the needs for certain products or services, and

can be influenced by specific brands or services, such as how, gender, and age group they are involved with, which brand they are heading to, which needs and desires will emerge, and which products or services it leads to more orientation.

In terms of marital status, it is possible to categorize as the target groups, young single, young married children without children, young married children with a child under the age of six, young married children with a child older than six, elderly married children with children, elderly married children without children and single widows. Especially at this distinction, the target is decisive on the life span of the kittens, the need for children to be newly married, the need for children to be newly married, and the tendency towards certain products decreases while increasing the orientation towards certain products. This creates a point for marketers to form a basis for market segmentation and sets the path for advertisers to improve the effectiveness of advertising by preparing appropriate messages for the marital status of the target audience. For example; children's toys that are not needed during the young single age are at the forefront in the young married stage of children (Odabaşı, Barış, 2002: 254).

For example; baby grooming and baby food advertising, couples waiting for babies, and young married children under six years of age, there will be no sense for young married children aged six or over. However, Akbank's Baby Fund advertisement, where a newly married and expecting baby can be found, can be seen as an advertisement for married couples who are both waiting for a new baby and younger than six.

For older married or married children, my children will be able to focus their time on travel, entertainment, and product needs so that this kind of product or service advertising will be more targeted to this audience. For example, a pair of couple and families are shown in the advertisements of Kilim Mobilya firm and the bride who answered "enough of rug" in order to ask the mother-in-law "what you want" is displayed while shopping at Rug Store. The second ad of rug focuses on the need to renew the sofa sets in the husband's house in preparation for marrying his sons. These rug ads, new married young couples, or young singles preparing for marriage take their children as the target audience for elderly married couples in preparation for marriage. As can be seen from the above examples, the marital status of the target group and the stage of marital status have an important influence on the advertising content in terms of advertisers.

It is important to note that the target groups have different cultural backgrounds, diverse elements of subcultures, lifestyles, habits, and differences in tradition-customs, where the masses in which they advertise different *geographical locations* or advertisements in different countries offer significant clues and are not eligible for creative work in creative work (Elden et al., 2008: 111).

In international or global advertisements, preparation of contents that will not be contrary to the social values and cultural structure of the addressed country, and where necessary, advertising of the local content specific to the addressed geographical area is effective on the success of the advertisement, as well as the effect of subcultures - rural, east-west etc.) should not be ignored. The place where sustains his life can differentiate his viewpoints on visual and auditory codes in the context of the advertisements, as well as his consumption and buying habits, lifestyle, increased need for certain products, and cultural influences. For this reason, advertisers should pay close attention to the perceptions of the cultural aspects that arise as well as the needs and requirements that the geographical location is active when creating the advertising content (Elden, 2009: 374-375).

For example; In addition to global advertisements being launched worldwide by companies operating in world markets such as Coca-Cola and Nike, advertisements that include Coca-Cola's unique symbols, such as the month of Ramadan, in particular the Turkish society and their values are geographically influenced by local advertisements to advertisements that are used.

However, one of the examples of advertisements in which elements such as life styles and traditions of subcultures are emphasized in the same country is Doğuş Çay commercial, in which Sinan Çetin also plays a role. In this advertisement, a peasant girl who lives in Karadeniz, a region where tea is grown in our country, says "The most beautiful tea is Doğuş Çay" with her regional Black Sheik Shivi in her local clothes.

Educational status provides useful information for determining the level of education of consumers, preparing advertising plans and strategies and implementing them effectively. Buying behaviors also vary, as a consumer with a high level of education and a consumer with a low level of education may differ in the demand for a particular product

or service. In this way, the selection of the media in which the advertising messages and messages will take place is determined, taking into account the educational situation of the consumer (Yaylıcı, 1999: 134).

A target group with a high educational level is more oriented towards technical products, complicated features and esthetically different products. In this context, it is much easier to perceive the content of a rational message that conveys these characteristics of a product with complex technical features in an ad that appeals to a target audience with a higher level of education. If an educational message is prepared for a target audience with a high level of education, the expected behavior of the target audience or the resultant emphasis on them can create a disturbing effect on the target audience at this level. They want to make their own decisions about what to do, or to arrive at themselves in the end. For this reason, the messages emphasized directly as the result should not be preferred while calling this mass (Elden, 2009: 371-372).

For example; In the Turkuaz Water advertisement, indirect benefits are used instead of direct benefits of water benefits, benefits of the consumption of the body and turquoise water properties. The advertisement, which starts with a mother who drinks a baby in a park and a turquoise water girl starts to take flowers from a child, helps the flower girl to download a little girl's kitten from the tree, this girl crosses an old uncle and her two uncles fight the two lovers, he continues to take the falling wallet of a certain person, who is a business man with a dress, and give it to him. At the end of the ad, the male character comes to the house and his wife, who sees the turquoise water at the beginning of the commercial, welcomes him. The advertisement, which ends with the slogan "Goodness is in its essence," is told that doing good will return to the person as finding goodness, and the goodness chain starts with the mother character who drinks Turkuaz Water. In this ad, there is no emphatic message about what to do directly to the target group, and the goodness, purity, health and benefit in the essence of the water are emphasized with an indirect expression.

Advertising messages to be prepared for low-level educational targets need to be prepared with clearer content that is simpler, easier to understand, leaner, and will not challenge the target audience, in contrast to the higher-level educational level. From this point of view, it will be a suitable strategy to prepare one-way message contents with direct narration instead of indirect narratives, instead of rational stimuli, where emotional stimuli and humor items are foregrounded at the end of the advertisement message (Elden, 2009: 371-372).

For example; the Ali Desidero Derby Shave Banner commercial, which struck a turning mark, has a direct expression of appeal to a lower level of education. Ali Desidero is presented as an opinion leader, approval authority, and goes to the factory where the razor blades are produced. "I see it all as educated children" seems to offer direct messages directing consumers as a person who decides on behalf of the advertisers.

The income situation, the economic situation in which the country is located, is one of the economic factors affecting the agency operations as well as all the production enterprises (Yaylıcı, 1999: 135). The state of the national economy is a loyal feature of consumer behavior. In the economy, the situation of the Gross National Rate, which is the monetary expression of goods and services created in a year, is considered as the most important data in determining per capita income. In countries where income per capita is high by increasing Gross National Rate, it is easier for people to turn to consumption. In such countries, where resources can be allocated for eliminating other necessities after eliminating their compulsory needs, management managers perform activities such as product diversification and product differentiation in a more intensive manner, and accordingly marketing and advertising activities develop and become active (Gürüz, 1999:87).

For example; Peti Danone, a food item for the child to use, is advertised in advertisements containing a vitamin that contributes to the child's healthy development of the product as well as the child being affected by the user in order for the child to be bought by his parents, rather than by his / her own paternity, and if you want your children to develop healthy as a conscious mother, you should buy Peti Danone "and parents and daughters are affected as purchasers and money is separated from family income.

Although the woman who will use the washing machine as an individual in the white goods advertisement will also need to separate a share from the family income, besides facilitating the housework of the woman, the issues such as the stability in general, economic washing programs and long- income is being tried to be shared with a common decision.

For example, Istikbal Regina Ready Kitchen is trying to make it easier to get a common share of family income through the presentation of "this is your living space" by presenting the kitchen as a living room where only the woman does not eat and eat food, where the whole family can spend time, even as a baby room .

Result

The ability of brands to sustain their lives depends on their preference by a specific target audience and the existence of loyal target kits. Advertising campaigns fulfill key objectives such as bringing brands together with target groups, informing target groups about the brand, and enabling the target group to choose brands. In fulfillment of these objectives, it is necessary to consider the demographic factors that are effective in shaping the buying behaviors of the consumers who constitute the target group to be effective in order to create ads that attract attention to the advertisement targeted by the advertisements and to ensure that the advertising content can create the desired effect.

Kaynakça

- Alemdar, A. & Kaya, R. (1983). Kitle iletişiminde temel yaklaşımlar. Ankara: Savaş Yayınevi.
- Aziz, A. (1982). Toplumsallaşma ve kitlesel iletişim. Ankara: Ankara Üniversitesi.
- Elden, M. (2009). *Reklam ve Reklamcılık*. İstanbul: Say Yayınları.
- Elden, M., Ulukök, Ö., Yeygel, S. (2008). *Şimdi Reklamlar...* (Üçüncü Baskı) İstanbul: İletişim Yayınları
- Gökçe, O. (1993). *İletişim Bilimine Giriş*. Ankara: Turhan Kitapevi.
- Gürüz, D. (1999). *Reklam yönetimi*, İzmir: Punto Yayınları.
- Karahan Ş. (2006). Sosyal Sorumluluk Kampanyalarının Tüketicilerin Satın Alma Tercihlerine Etkisi.Yüksek Lisans Tezi. Ege Üniversitesi, Sosyal Bilimler Enstitüsü, İzmir.
- Karpat, I. (1999). Bankacılık sektöründen örneklerle kurumsal reklam, İstanbul: Sahaf Yayınevi.
- Kocabaş, F., Elden, M. (2006). *Reklamcılık: Kavramlar, Kararlar, Kurumlar*. İstanbul: İletişim Yayınları.
- Mutlu, E. (2008). *İletişim sözlüğü*, Ankara: Ayraç Yayınevi.
- Odabaşı Y., Barış G. (2002). *Tüketici Davranışı*. İstanbul: Mediacat Yayınları.
- Odabaşı, Y. & Oyman, M. (2002). *Pazarlama iletişimi yönetimi*. İstanbul: MediaCat.
- Yaylacı, G. (1999). *Reklamda Stratejilerle Yönetim*. İstanbul: Alfa Yayınları.

The Balance Lifestyle Of Malay Muslim Students In Private Higher Learning Institute: A Study In Sunway University

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Abstract

The purpose of this research is to identify the profiles and balance in lifestyle of the Malay Muslim students who are the minority group in Sunway University. The research respondents consist of 70 students who are pursuing a professional accounting course in which the average academic achievement of all the subjects taken is at least 60 percentage. The collection of data is done by giving out questionnaires that were answered by the respondents. The descriptive analysis method used to identify the frequency and percentage of the balance level of the students' lifestyle consist of the relationship with Allah, relationship with other people, academic development, health management, financial and excellent time management. The research finding had determined that the Muslim students in private institute have mediocre lifestyle balance except for their relationship with Allah which is noticeably high.

1. Introduction

Private higher learning institutes have become more important to the education field in Malaysia in the recent years. The inability of public institutes to accommodate new enrolment of students has led to the establishment of private colleges and universities, in order to provide the opportunity to students who are unable to secure their places in public institutes in order to continue their studies.

However, in the effort to pursue their studies in private institutes, students especially the Muslim students will be facing various challenges and predicaments in their studies and daily lives. Some examples of the problems encountered by students in private institutes are the relationship with their friends, skipping classes, financial problems, language barriers, cultural shock and getting negatively influenced by their peers (Ng Wei Leng 1999:64). In addition to that, students in private institutes especially those in Sunway University consist of multiple races including Chinese, Indians, internationals students and the minority groups of Malay Muslim students. Thus, it is very likely for this minority group of students to be exposed with a totally different lifestyle, as compared to their school days which focused more on the all-around excellence, academically, spiritually and personality-wise. The goal of achieving the overall balance in all these aspects can be more easily executed in school because most of the students were Muslim Malays as compared to their university lives where they are given more freedom to decide on their own. Furthermore, students in private institutes come from various backgrounds, different religions, races and even countries, which force the Malay Muslim students to accept and adapt to a very different environment from their school days.

The question is, can the Malay Muslim students adapt to the university life in private institutes? Will they be able to maintain the same lifestyles from their school days? Hence, the purpose of this research is to identify the level of balance in the Malay Muslim students' lifestyles in private institutes, which consist of relationship with Allah (spiritual), relationship with other people (social), academic development, health management excellent financial and time management.

2. The Balance of Muslim Students' Lifestyle

According to the dictionary (2001), balance is defined as equally distributed and unbiased. Meanwhile, lifestyle is defined by the dictionary (2001) as the way of life of a certain individual. According to Plummer (1983), lifestyle is how an individual spends his day, what he presumes as important in his life and what he thinks of his surroundings.

In the *International Encyclopaedia of the Social Sciences & Behavioural Sciences* (2001), lifestyle is defined as life patterns practiced by people who are classified into different classes within a society. The classes are measured from multiple aspects such as participation in social activities, housing areas, housing appliances, vehicles, clothes,

education, social status and behaviours. Thus, lifestyle is a life pattern of a certain individual who is identified by his activities, interests and views on something.

On the other hand, the balance of a Muslim student’s lifestyle is to integrate spiritual, physical and emotional elements in his lifestyle, whether it is from the daily activities, interests or views on certain things. In discussing the balance of Muslim students’ lifestyle, a few elements have to be managed in order to achieve balance between spiritual, emotional and physical aspects. The elements that drive the balance of a Muslim student’s lifestyle is shown in figure 1:

Figure 1: Elements of a balanced lifestyle of a Muslim Student



The general dimension of a Muslim student's lifestyle balance is as shown in Table 1 below:

Table 1: Summary of the dimension of a Muslim student's lifestyle balance

Relationship with Allah	Performing daily prayers, reciting the Quran, fasting, believing in fate, believing in effort and reward, praying to Allah, believing in failures and never gives up (Al-Qadir:2015).
Relationship with Others	Keeping in touch with the parents, frequent meeting with the lecturers, keeping in touch with the friends, studying in groups, sharing knowledge, participating actively in clubs and society, sharing and listening to other people’s problems. (Baharin Mesir, 2003)
Academic Development	Striving towards excellence, jotting down notes in lectures, managing study time properly, asking questions to the lecturers, able to understand the lesson easily, preparing before the lectures, looking for references in the library, doing daily revisions. (Norhani Bakri, 2005)
Health Management	Rarely fallen sick, maintaining dietary diet, exercise frequently, good stress management, ensure enough rest. (Yusoff al-Qaradhawi, 1998)
Financial Management	Good financial management, thrifty, do not spend money excessively (Yussof Al-Qaradhawi, 1998), do not burden the family with financial problems. (Ng wei Ling, 1999)
Time Management	Self-study for more than 4 hours daily, sleep at least 6 hours daily, go to bed before midnight, wake up before 6 am, be in class 5 minutes early, do not waste time (Rafiq bin Abdullah 2004)

3. Research Methodology

This is a quantitative research using questionnaire as the instrument of study. Sample size consists of 70 Malay Muslim students in Sunway University who enrolled in Professional Account course which consist of CAT and ACCA programs. The data analysis is conduct using the descriptive analysis and the results of study is shown by

using table which indicates the frequency and level of percentage of Muslim students' lifestyle which contain five Likert scales. The obtained data is analyzed using the Statistical Package for Social Students (SPSS). The ranking of the Muslim students' lifestyle is categorized into high level, intermediate level and low level as shown in table 2 below:

Table 2: Level of Muslim students' lifestyle

Level of Muslim students' lifestyle	Score
Low	0-1.6
Intermediate	1.7-3.4
High	3.5-5.00

4. Results and discussions

Based on the analysis that has been done, 70 questionnaires were obtained. The discussions of result are divided into several aspects:

4.1 Students' background

From the analysis, the percentages of male students are 38.6% while the female students are 61.4%. All of them enrolled in Professional Account course. Majority of the respondents are students funded by Yayasan Peneraju scholarship. While the examination grade for the respondents are from average grade (60%-79%) which is 58.6% up to excellent grade (80%-100%) which is 41.4%.

From the respondents' school background, research analysis found that majority are from boarding school which is 72.9%, as shown in table 3:

Table 3: Respondents' previous high school

Previous School	Frequency	Percentage
Fully Boarding School	26	37.1
MRSM	25	35.7
Public high school	13	12.6
Private school	4	5.7
Public high school	2	2.9
Total	40	100

4.2 The Balance of Malay Muslim Students' Lifestyle in Sunway University

The balance of Malay Muslim students' lifestyle in Sunway University consists of relationship with Allah, relationship with others, academic development, health management, financial and time management.

4.2.1 Relationship with Allah SWT

Relationship with the Creator is one of the main characteristics that picture the lifestyle of a Muslim student. In this aspect, research has emphasized on the five daily prayers, tahajud or dhuha prayers, reciting al-Quran, fasting, to believe in fate, to believe in effort and rewards, to pray and to trust in Allah and to believe that failure is a part and parcel of life. From the analysis done, it is found out that the relationship between respondents with Allah is high that is 72.9% as shown in table 4 below. This proved that Malay Muslim students in Sunway University still emphasis on spiritual elements within themselves. This research supports the research done by Suzyliana Mamat (2016), have discovered that having close relationship with the Creator will shape spiritual intelligence and emotion of a student. As quoted by her, high emotional intelligence will develop good behaviour of the student.

Table 4: Level of respondents' relationship with Allah

Relationship with Allah	Frequency	Percentage
High	51	72.9
Moderate	19	27.1

4.2.2 Relationship with Others

Students cannot exclude themselves from human to human relationship. The relationship between human that should be done by students include maintaining the relationship with their parents, lecturers and housemates or even their classmates. Analysis done have discovered the level of relationship between respondents and other human the majority is moderate which is 58.6% compared to high level which is 41.4% as shown in table 5 shown below. This proved Muslim students in private higher education Institutions still prioritize and maintain good relationship between human. This research supports the research done by Baharin Mesir (2003) that assumes each student should have good relationship with their parents, lecturers and friends. Good relationship with other people will surely help to ease all their effort to achieve success in their studies.

Table 5: Level of respondents' relationship with others

Relationship with human	Frequency	Percentage
High	29	41.4
Moderate	41	58.6

4.2.3 Academic Development

In the aspect of academic development, this research aimed to observe on how students managed to achieve success in their studies. This includes taking lecture notes, good time management, consulted to their lecturers, making preparation before lectures, finding revision materials at the library and doing revisions every day. The result of the analysis discovered that the level of academic development mostly is moderate which is 58.6% compared to high level which is 41.4% as shown in table 6. This proved that respondents are serious when comes to their academic development. These researches supported the research done by Baharin Mesir (2003), which is a student that excelled in his studies and a student that responsible and work hard to achieve success.

Table 6: Level of academic development

Academic Development	Frequency	Percentage
High	29	41.4
Moderate	41	58.6

4.2.4 Health Management

In the aspect of health management, this study is carried out to observe how students conduct self-health management such as monitoring food and diet, exercising, being wise upon managing stress and having enough rest. Based on the performed analysis, it is found that the majority of people with medium-level of health management is 68.6% rather than the higher level which is 31.4% as shown in Table 7 below. This proves that the respondents are monitoring their health wisely. This study supports the study outcome carried out by Baharin Mesir (2003) which states that an excellent student is a student who is an expert in monitoring his/her health. This is because a fit body will definitely result in having an excellent and balanced spiritual, physical and emotion.

Table 7: Level of Health monitoring

Health Monitoring	Frequency	Percentage
High	22	31.4
Medium	48	68.6

4.2.5 Financial Management

As for the aspect of financial management, this study is carried out to observe how students manage their finance; saving, prioritizing needs rather than wants, managing finance wisely, does not bother family members with financial issues and does not bother to follow the latest trend. Based from the analysis done, it states that the level of financial management is medium, 52.9% rather than the higher level which is 47.1% as shown in Table 8 below. This also proves that the respondents are able to manage their finance wisely. This study supports the one carried out by Ooi Yoon Phaik (2002) and Misra & Mc Kean (2000) who found out that a less effective financial management is one of the causes which leads students to be stressed. However, if the student is able to manage his/her finance wisely, this condition will lessen the stress upon the students.

Table 8: Level of Financial Management

Financial management	Frequency	Percentage
High	33	47.1
Medium	37	52.9

4.2.6 Time management

From the aspect of time management, this study is carried out to observe how students manage their time wisely such as time for studying, sleeping, class attendance, revision session, updating general knowledge and carrying out the things we love or hobbies. The outcome of the study tells us that the majority level of medium time

management is 72.9% compared to the higher level which is 27.1% as shown in Table 9 below. This proves that respondents are capable of managing their time intelligently. The study supports the one carried out by Baharin Mesir (2003) which assumes that an excellent student will always be ready and is capable of managing his/her time wisely.

Table 9: Level of Time Management

Time management	Frequency	Percentage
High	19	27.1
Low	51	72.9

Conclusion

Based on the analysis conducted on the lifestyle of Muslim students in private higher learning institute found that the lifestyle of Muslim student in Sunway University is at a moderate level, in the exception of their relationship with Allah, which is at a high level. This research proves that the respondents have a balanced lifestyle. The research also found that most of the Muslim students in Sunway University were excellent students back in their high schools because majority of them came from boarding schools. In addition to that, the research also found that the students managed to achieve excellent marks in their examination in which most of them scored at least 60 percent.

Furthermore, the finding of this research also proves that the Malay Muslim students in Sunway University do not only have strength in spiritual aspects but also emphasize on their academic achievements, possess strong personalities and spiritual aspects. The all-around strengths make the students not only emotionally, mentally and physically strong, but also make them not easily influenced by surrounding external factors. This research also supports Mohd Anuar (2011), who claims students who are able to balance the spiritual, intellectual, social and physical aspects of their life will achieve excellence in higher learning institute, both public and private. In conclusion, this research has answered the question in which Muslim students in Sunway University have balanced lifestyle and are able to adapt to the private higher learning institute.

References

- Baharin Mesir, Jamaludin Mohd Yatim, Azmahani Abd Aziz, Mohd Hidayat Jamal and Muzaffar Zainal Abideen (2003). *Excellent students lifestyle in campus environment, proposal paper of the committee of Excellence students Program*. University of Technology Malaysia: Faculty of Civil Engineering.
- Beil. J Smelser and Paul B Batlers (2001). *International Encyclopaedia of the Social Sciences & Behavioural Sciences*. UK: Elsevier Science Ltd.
- Julie Pallant (2013). *SPSS survival manual: A Step by step guide to data analysis using IBM SPSS*. 5th Edition. England: Mc Graw Hill.
- Kamus Dewan* (2001) Kuala Lumpur: Dewan Bahasa dan Pustaka.
- Misra, R. and Mc Kean M. (2000). College Students Academic Stress and Its Relationship to Their Anxiety, Time Management and Leisure Satisfaction. *American Journal of Health Studies*. 16: 41-52
- Mohd Anuar Abdul Rahman and Nursharil Abdul Hamid (2011). Environmental Impact on Student Emotional Development at Faculty of Education, University of Technology Malaysia. *Journal of Education Psychology and Counselling*. Volume 1, March, pages 141-161
- Ng Wei Ling (1999), *The Lifestyle of Private College Students: A Case Study at Sunway College, Selangor*. University of Malaya: Department of Anthropology and Sociology, Academic Exercise.
- Norhani Bakri, Noor Zainab Abd Razak, Hamidah Ab. Rahman dan Aminah Hj Ahmad (2005). Cause of Poor Learning Performance Among Students from Management and Human Resource Development Faculty, University of Technology Malaysia, Johor. *Journal of Technology* 43 (E) Dis. Pp 29-44
- Ooi Yoon Phaik (2002). *Stress and Anxiety among Engineering Students and Non Engineering Students at UTM*. University of Technology Malaysia: Academic Exercise.
- Plummer, K (1983). *Documents of Life: An Introduction to the Problems and Literature of Humanistic Methods*. London, Unwin Hyman.
- Rafiqah bin Abdullah Husin (2004). *Time Management among Students: A study on undergraduate students of sciences and education (Islamic Studies) in University of Technology Malaysia*, University of Technology Malaysia: Academic Exercise.
- Suzyliaana Mamat (2016), Emotional Quotient among Teenagers in Islamic College and University Melaka. *Journal of Social Science*, Volume 1 2016: 115-136
- Syeikh Abdul Qadir bin Abdul Muthalib al-Mandili (2014), *The cure for heart*, Verification: Dr Abdul Basit bin Hj Abdul Rahman. Selangor: PTS Publishing House.
- Yusoff al-Qaradhawi (1998). *The Role of Values and Morals in the Islamic Economy*. Translate by Mufti Labib & Arsil Ibrahim. Kuala Lumpur: Blue T. Sdn Bhd.

The Challenges Of Faith Education Of Islam In The Formation Of Malaysian Muslim Behaviour

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Abstract

Taking a look at the data of moral collapse among Malaysian youth, the Malay Muslim youth serve as the major contributor compared to other races. According to racial division, 204 recorded cases involving the Malays, while 54 were Chinese and 47 were Indian. This has raised questions among the Malaysian scholars, especially the Muslim scholars, because the figure doesn't add up with what Islam teaches; to practice noble values and to uphold the faith. What is happening to the Muslim community in Malaysia nowadays is contrary to what a Muslim is supposed to be. Hence, this research is aim to study the status of Islamic faith education and its significance in facing the challenges of Muslim behaviour. Qualitative study is applied in this research by collecting primary and secondary data from printed materials in order to build a basic theoretical framework of the study. Obtained data from books, journals, magazines, proposals, newspapers, dissertations, theses, brochures, websites and any form of information are being referred to assist researcher to achieve the objective of the study. These forms of resources are categorized as secondary data. To analyze the data, this study is referring to the basic theory of Islamic faith in order to gain more understanding of the forms of behaviour of Muslim society in Malaysia. From the finding, the data are analyzed and evaluated whether the forms of behaviour of Muslim society in Malaysia are derived from Islamic education or otherwise. In Malaysia, the current development of Islamic education has developed its own niche in the Muslim community, as Islamic education has been taught starting from the school level until the tertiary level with the implementation of the Islamic and Asian Civilization Curriculum (TITAS). Based on the findings, researcher has found that Muslim Malaysians at least committed three forms of behavioural deviation from Islamic faith, namely the deviation of the faith through speeches, the deviation of the faith through acts and deviation of the faith through writing. This somehow has given impression that the Islamic education is incapable of being translated into life and one's behaviour. The concept of Tauhid can not be understood comprehensively so as not able to give a positive impact on life and also depicted that the Islamic faith is being separated from life. Although the Islamic education system has been implemented at every level of education, it indicates that Islamic

education seems to be needing more improvements on the quality of its learning outcomes. This is because some form of allegations of faith among Muslims in Malaysia through behaviour still exist in the society.

Introduction

Teenagers in Malaysia are the main community groups estimated to have about 60% to 70% of the population of nearly 30 million. Being an important asset for the society and nation, teenagers play a significant role to contribute to the development and progress of a nation in the future. With the growth of political, economic and social taking place rapidly, it is undeniable the teenagers in Malaysia today are struggling to get through the social dilemma and confusion of life. To name a few, the common social problems caused by today's adolescents are the free sex that starts from promiscuity, runaway teens, drug abuse, alcoholism, illegal racing and teenage involvement in crimes such as stealing, robbing, raping and murder cases. And day by day, these social problems are worsening at an alarming level.

In 1998, Malay Muslim youth served as a major contributor to moral collapse data compared to teens from other races. According to racial division, 204 recorded cases involving the Malays, while 54 were Chinese and 47 were Indian. This often become question mark amongst the Malaysian scholars, due to high percentage of moral collapse by the Malay Muslims, while Islam itself educates its people to practice righteousness and good values. Within 10 years between 1989 and 1998, the crime rates involving male teenagers increased by 35 percent, while female teenagers by 25 percent, and in 1998 itself, 6338 new cases involving adolescents were reported. To no surprise, the Malay Muslim contributed the biggest figure. Even in 2016, the Ministry of Health Malaysia revealed a total of 3,980 cases of 28.8% of 13,831 teenagers who were born out of wedlock in the age of 10 to 19 years, while the Royal Malaysia Police confirmed that 432 cases of baby dumping were reported from 2011 to June 2015. (Nurul Husna Rosidi, 2017). These data and reports depicted that the supposed identity of teenagers of Malay Muslim are slowly degrading. Thus, researcher will study the status of aqidah education and its importance in battling the challenges of Muslim behaviour.

The Study

A qualitative approach has been applied throughout the process of completing the study. During the data collection process, all the printed materials are regarded as primary and secondary data for the purpose of building a basic theoretical framework of the study. Therefore, the basic primary data that touch on the topic of Muslim's faith and background of Islam in Malaysia will be used further in the analysis so that the theoretical foundation on the basis of Islamic religious education is based. Hence the printed materials produced by experts in the field of Islamic faith are used in constructing the theoretical basis of this study. Apart from that, secondary data are obtained from books, journals, magazines, academic papers, scientific studies, dissertations, theses, pamphlets, websites and any form of information which found to be helpful are being referred to assist researcher to achieve the objectives of the study. These secondary data act as a helping hand because it allows the researcher to gain different perspectives of the study by comparing the concepts and debates among authors and authoritative researchers in the field of Islamic faith, in particular, relating to Muslims in Malaysia. In this case, the method of document analysis is being used.

To analyze the data, this study emphasizes on the basic theory of Islamic faith; the Quran and the Sunnah of the Prophet. The basic theories will be constructed based on description and details by the leading Islamic scholars. From this theory, obtained data regarding the faith and behaviour of the Malaysian Muslim community will be evaluated and analyzed.

The study applies the aqidah theoretical framework which means the belief, confidence and firm imaan cannot easily be shaken and unravelled by any influence capable of damaging either from internal (spiritual) or external aspects (physical) a person's self. Tauhid means knowing, believing, acknowledging and pledging that the God is true and right to be worshiped. Apart from Him, it is untrue and not worthy to be worshiped. Appreciation of the tauhid includes pledging with the heart, expressing it by tongue and proving by deeds. Therefore, a person who is a believer in tauhid must know, understand and live by the faith. The faith then is translated into absolute obedience through behaviour towards the teaching of Islam. In fact, the faith is a driving force for those who earnestly believe in God and keep them away from all the prohibitions of Allah ('Al-Jazairi, Abu Bakar Jabir, 1985). Thus, during the analysis process, researchers are trying to analyze the forms of behaviour of Muslim society in Malaysia. From the findings, this study will analyze and evaluate whether the forms of behaviour of Muslim society in Malaysia are derived from Islamic religious education or otherwise.

Finding

Today, it is undeniable that the development of Islamic education has gained its place in the heart of the Muslim society, as compared to the 1980s where the society overlooked the importance of Islamic education. The tahfiz

institution back then did not receive encouraging response from parents to send their children there. But as time passed, the tahfiz education system has been upgraded and equipped with better facilities and able to be at par with the academic education system. The discipline of the tahfiz education system in Malaysia has also been reviewed to meet the established standards, be it in the aqidah or or co-curriculum implementation as stipulated by the religious affairs of the Selangor Islamic Religious Department (JAIS), the Department of Islamic Development Malaysia (JAKIM) and the Ministry of Education. In fact, there are also Tahfiz Institutions that integrate the discipline of memorization of al-Qur'an with the common academic system taught in regular schools in order to produce the professional huffaz who can fully remember the whole Qur'an. This progress has led Muslims to be more confident to send their children to the Tahfiz institutions to strengthen the understanding of the aqidah in the face of a challenging era. The changes made by the founders of these tahfiz institutions has contributed to curbing and reviving the Western's influences that could spoil the faith of Muslim community in Malaysia (Nor Kamariah Abdul Manaf, 2013).

Even at the tertiary education level in Malaysia, the implementation of the Islamic and Asian Civilization Curriculum (TITAS) has an important role in strengthening the aqidah of the Muslim youth comprising the students of both public and private universities. The execution of the TITAS curriculum is not only aimed at enhancing the understanding of Islamic teachings, but also a way to study the glorious history of Islamic civilization in Malaysia and Asia, thereby strengthening the aqidah of students so as not to be affected by the growing threat of liberal thinking in today's society. (Nor Hayati Fatmi Talib, 2014).

However, the practice of Islamic education and teaching systems in Malaysia are still accustomed to traditional teaching and learning methods whereby the input and explanations are solely given by teachers. This one-way teaching method is not helping the students to develop a sharp-minded thinking and curbing the freedom to ponder about religion, because the pattern of thinking, be it about ibadah, hadith, aqidah, sirah and akhlaq are centralized on teachers instead of students. The problem of teacher-centred teaching and learning need to be changed in order to be in line with the current will to attract students to learn about Islam and thus enhance the belief towards Allah S.W.T. (Zakaria Bin Abdullah, 2012; Alias Azhar, 2013, p.59-72). This has led to the emergence of some forms of religious deviation in Muslim society in Malaysia which can be categorized as follows:

1. Deviation of faith in word.

This kind of deviation takes place when a Muslim deliberately renounce matters that can invalidate the faith as per the fundamentals of ahlu Sunnah Wal Jamaah, that is to say something with a view to deny the proven nass. For example, according to Abur Hamdi Usman et. al (2016), the anti-Hadith group disregarded the Prophet Muhammad's Hadith as the second source of Islamic law that they solely depended the legal resources to be taken from the Quran. The arguments adopted by the anti-Hadith group are as follows;

- a) They claimed that the hadith as a deviation from the teachings of the Prophet Muhammad s.a.w and can not be accepted as a source of Islamic law as they were not recorded during the Prophet's lifetime
- b) Qur'an is a revelation sent down to Prophet Muhammad s.a.w through Angel Gabriel and is considered complete, perfect and detailed. Therefore, the Qur'an does not require any form of interpretation nor translation.
- c) The true teaching of God is during the lifetime of the Prophet Muhammad s.a.w as the last Prophet and brought by him is only the Qur'an and nothing else.
- d) Regarded the hadith as a historical record that may and should be examined by researchers to understand and assess the times.
- e) The expression of syahadah by the Muslims nowadays is prohibited by the Qur'an because the compulsory syahadah is only La Ila Haillallah.
- f) Refused to believe in Qada 'and Qadar which is one of the most important aspects of the Pillars of Faith because it was revealed through the hadith and considered contrary to what is found in the Qur'an.
- g) The interpretation of the word al-hikmah in surah al-Baqarah verse 2 which was interpreted by al-Imam al-Syafie as Sunnah or hadith is unreasonable. They referred to the interpretation by Maulana Muhammad Ali which stated that the word al-hikmah is one of the names of the Quran. (Abur Hamdi Usman, et. al, 2017).

2. Deviation of faith through deeds.

The deviation occurs when a Muslim intentionally acts without compromising matters that is against the fundamentals of ahlu Sunnah Wal Jamaah. Among the corrupted acts according to Izhar Ariff Mohd Kashim (2016) are as follows;

- a) Performing shirk practices that can debauch the aqidah, for example the worship of ancestral spirits, feeding the occult matter during certain times, worshipping shirk things which are believed to increase the wealth, to get offsprings and to guard the property and residence.
- b) Participating in the practice of the non-Muslims through the act or speech that associates worshipping and praising other than Allah SWT. It is permissible for Muslims to engage in non-Muslim ceremonies, as long as it

is not related to religious rites such as celebratory ceremonies, provided that the ceremonies are not incorporating the illegal things in Islam, such as drinking alcohol, promiscuity, consumption of non-halal food and the likes of it.

c) Wearing garments that resembles other religions or insulting Islam, for example wearing garments that have the symbol of the cross, praising Jesus or any images and wordings that might be offensive for Islam (Wardati Mohd Saini, et. al, 2015).

3. Deviation of faith through writing.

To write something that contradicts the aqidah in conscious abandonment is assumed as deviation of faith. The dissemination of the writings are as follows:

a) Shame Writing Against Islam.

The writing can be in the form of stating Shari'a law is not in accordance with the country law to be applied to the basis of the nation's advancement. For example, the practice of sharia law can stave off the progress of a country or declaring that Islam is no longer relevant to the era of globalization of the world whereby situation of a country will not be safe if the people still practice the Shari'a law (Muhammad Qutaibah Suliman, et. al, 2105).

b) Liberalism Writing.

Liberalism is an ideology, a western philosophy and a political perspective, based on the understanding that freedom from religious guidance in the development of a country is the main foundation. Liberalism has the goal of building a liberated society with equal freedom of speech and freedom of thought for every individual. Liberalism repudiates the boundaries of ideas controlled by government and religion. The liberalism writing emphasize that the exchange of ideas must be free, individuals must not be economically exploited and reject the restrictions on individual ownership. The objective of liberal writing is to create a secular state that separates the religion interests of the individual with the interests of the state, but in a condition where the state still protects the interests of the individual and makes the principle of religion only as an individual's interest. Liberal writers aim to liberate the nation from the influence and upperhand of religion where the state has no rules and does not intervene in religious matters. The policies laid down have the meaning that the country does not prohibit or encourage a person to follow the rules of religion, any guidance made for the development of the country is based on the results of national leaders' decisions and it must be final and enshrined in the country's legislation which is believed to be a positive basis for national progress. Meanwhile, religious issues are individual problems that have been separated from the state (Haslinda Binti Hassan, 1999).

Conclusion

All forms of behaviour that have been marked as the abolition of the aqidah (deviation of faith in the form of words, deeds and writing) is a manifestation of the method of Islamic education which is in the form of text teaching without a thorough understanding and far from the appreciation of the aqidah is capable of being a driving force for every Muslim's behaviour. As a result, the Islamic knowledge is not being fully understood and failed to be translated into life and one's behaviour. To add up, with the challenges of today's technological achievement influenced by the lifestyle of materialism and secularism, the old approach of the Islamic education has made it difficult and weaken the appreciation of the Islamic faith. The concept of Tauhid cannot be grasped comprehensively so as not able to give a positive impact on life. The understanding of God or the aqidah is only understood by the Muslim community just to comply with specific deeds such as fasting, zakat and hajj only. Although the Islamic education system has been implemented at the school and tertiary level, it indicates that Islamic education is in dire need of improvements and enhancements of the quality of its learning outcomes. This is because these forms of faith deviation still exist among Muslims in Malaysia.

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References

- Abur Hamdi Usman, Rosni Wazir, Mohd Norzi Nasir, Suriani Sudi, Zanariah Ismail, Sakinah Salleh & Azman Abdul Rahman. (2016). Golongan Anti Hadis: Isu Dan Cabaran. In *Kertas Kerja Muzakarah dan Mu'tamar Hadis kali ke-1 2016*. Bangi: Institut Kajian Hadis (INHAD).
- Abur Hamdi Usman, Rosni Wazir, Zanariah Ismail. (2017). The Notion of Liberalisation On the Anti-Hadith Movement and Its Impact On Society. *Al-Irsyad: Journal of Islamic and Contemporary Issues: Disember Vol. 2(2)*, 81-94.
- 'Al-Jazairi, Abu Bakar Jabir. (1985). *Aqidah Mu'min*. Kaherah, Mesir: Darul Kitab al-Salafiyah.

- Alias Azhar. (2013). Pendemokrasian Sistem Pendidikan Islam di Malaysia: Satu Tinjauan. *Jurnal Kajian Pendidikan: Jun 3(1)*, 59-72.
- Haslinda Binti Hassan. (1999). *Sekularisma: Sejarah kelahiran dan kesannya terhadap serangan pemikiran*. Master of Arts Thesis. Kuala Lumpur: Fakulti Sastera dan Sains Sosial, Universiti Malaya.
- Mohd Izhar Ariff Mohd Kashim. (2016, August 11). Waspada punca yang menyebabkan akidah terbatal. *Berita Harian*.
- Muhammad Qutaibah Suliman, Muhammad Inamul Hassan Muhammad Shah & Sulaiman Shakib Mohd Nor. (2015). Gugatan Akidah: Reda dengan Kekafiran. In *Prosiding Seminar Pemantapan Akidah 2015*. Fakulti Tamadun Islam, Universiti Teknologi Malaysia.
- Nor Hayati Fatmi Talib. (2014). *Penilaian Pelaksanaan Kurikulum Tamadun Islam dan Tamadun Asia (TITAS)*. Master Degree Thesis. Bangi: Universiti Kebangsaan Malaysia.
- Nor Kamariah Abdul Manaf. (2013). *Integrasi Pengajian Tahfiz Al-Quran dan Akademik di Maahad Hafiz Klang*. Master Degree Thesis. Bangi: Universiti Kebangsaan Malaysia.
- Nurul Husna Rosidi. (2017, Mei 8). Akhlak remaja Melayu semakin meruncing. *Utusan Malaysia*. Retrieved from <http://www.utusan.com.my/rencana/forum/akhlak-remaja-melayu-semakin-meruncing-1.478633>.
- Wardati Mohd Saini, Noramizah Mohd Yatim Nurin Safia Mohd Puaad, & Jimain @ Ajmain Safar. (2015). Gugatan Akidah: Hak Selain Allah swt dalam Hukum Syarak. In *Prosiding Seminar Pemantapan Akidah 2015*. Fakulti Tamadun Islam, Universiti Teknologi Malaysia.
- Zakaria Bin Abdullah. (2012). *Pengajaran dan Pembelajaran Berasaskan Pendekatan Berpusatkan Pelajar Dalam Pendidikan Islam di Sekolah Menengah Kebangsaan*. Phd Thesis. Bangi: Universiti Kebangsaan Malaysia.

The Connection Between Work And School Life of Vocational School Student: Business Department Sample*

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Abstract

At Vocational School level, work is specified final years of an apprentice level course. Since the lot began to vary human-focused situation by the outcome of up to date life, every firm tried to proffer the best class. At the end of the on hand check it is central to weigh up whether much loved areas are reached. Didactic institutions are the elementary originalities where these areas must be modernized (Tuononen at all., 2015).

The cram aimed to investigate how working even as studying is associated to cram victory and took lines to erudition and the scenery of the work. A total of 154 student done a feedback form at the point in time of their promotion day. The conclusion exhibited that doing a new abstract work was associated to focal point to erudition, and non-abstract work was associated to an uncomplicated cram of courses. Also, we set up that considered studying has an imperative responsibility in terms of application practice. By focusing student' organizing helps and highlighting their deep-level erudition, student come across it straightforward to construct connection between work and sermon studies.

Key words: *Vocational school, student, work, graduation, non-academic work*

Introduction

Periods of work and work-based learning is a useful application that most young people work the work environment. Vocational School students every greater than the world fit into place in pay while erudition at school. Explore studies explain that the sum of working student has amplified in numerous countries over the years, for case in point in turkey, Czech republic and Nederland (Barley, Z., Lauer, P., Arens, S., Apthorp, H., Englert, K., Snow, D., Akiba, M. 2002; Tuononen at all., 2015; Ryan et al. 2011; Manthei And Gilmore 2005). Robotham (2009) argues that numerous students could expend supplementary time at their work place than in university programs. In addition, the authors bear the plan that the student must expend supplementary time at their work place than in university programs. For foremost explanations of student work during learning at school we can say two intentions that top the rate of existing settings and in advance work for coming occupation. But it is wanting to add the student' work is commonly non-abstract, for example, working in the textiles or package sector (Broadbridge And Swanson 2006). And, the work is frequently not associated to their training grounds and potential occupations because of their first measures to first-class the working dwelling is cost-effective to a certain extent than educational (Tuominen at all., 2015).

In all education system all over the world, student need to finish their studies surrounded by a restricted time. Educational explore on the connection between functioning and school life postponements restrained is unusual. Functioning is usually realized that a significant subject donating to tumbling way. A lot of academicals trainings probing the family between working and School life have note that working much than 20 hours every week enlarged the stopping of School life. Also, linked to non-working student, working numerous periods didn't rise the threat (Barley, Z., Lauer, P., Arens, S., Apthorp, H., Englert, K., Snow, D., Akiba, M. 2002; Tuominen at all., 2015; Hovdhaugen 2013; Moulin et al. 2013). Correspondingly, Tuominen at all., (2015) strained which all time work appears to non-positive act the measurement lengthwise of the search, excluding that part-time work does not. Vocational Schoolwork, also known as work-based learning, provides an opportunity to relate what student is learning in school to the world of work.

Methods

The study was passed out at Kocaeli Vocational School of Kocaeli University In Turkey. The facts were together in the spring of 2017 from beginning to end an electronic questionnaire. A total of 154 business department student done the opinion poll at the time of their promotion. The contestants were female 54 % (n = 83) and male %46 (n = 71). The ages varied from 21 to 38 years (m = 27, sd = 6.3): more than a third of the contestants were fresher than 23 eons. (Tuononen at all., 2015).

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The useful feedback form precise the student' work and lines to erudition. The scenery of the work was not speaking into three categories: own abstract work, other abstract work and non-abstract work (Tuominen at all, 2015).

- *Other academic work meant work that was academic but differed from the student's own study field.*
- *Own academic work meant work that was related to the student's discipline or major.*
- *The third type had no connection to university studies.*

This cataloging planned by the playwrights of the flora of the work connected with the student' own estimations of their works. Student was inquired how many hours they achieved unlike varieties of work on usual per week thru the second year of education. The ruler stayed 1 = none, 2 = less than 20 h and 3 = more than 20 h. For the student may have had unlike varieties of works, it was fashioned a flexible work in which 1 = no work, 2 = own abstract work, 3 = non-abstract work, 4 = both own abstract work and non-abstract works (Barley, Z., Lauer, P., Arens, S., Apthorp, H., Englert, K., Snow, D., Akiba, M. 2002; Tuominen at all, 2015). Variables calculating the flora of work and training victory are existing (table 1).

Table 1. Variables measuring the nature of work and study success (Tuominen at all., 2015)

Variable	indicator
Nature of work	
Own academic work	1 = none, 2 = < 20 h, 3 = ≥ 20 h
Other academic work	1 = none, 2 = < 20 h, 3 = ≥ 20 h
Non-academic work	1 = none, 2 = < 20 h, 3 = ≥ 20 h
Work	
1	= no work
2	= own academic work
3	= non-academic work
4	= both own academic and non-academic works

Findings

The outcome showed that 88 % of the student had worked all through their last year of studies. 30 % had own academic work and 21 % non-academic work. Also, 37 % had both an own academic and non-academic works. Only 12 % of student had no work. More than half of the student worked less than 20 h per week and 44 % of them more than 20 h. The number of students' works are presented in table 2 (Tuominen at all., 2015).

Table 2. The nature and amount of student' works

	F	%
<u>Nature of work</u>		
No work	18	11.7
Own academic work	46	29.9
Non-academic work	33	21.4
Both own academic and non-academic works	57	37.0
A total of cases	154	100.0
<u>Amount of working (per week)</u>		
None	25	16.2
<20 h	61	39.6
≥ 20 h	68	44.2
A total of cases	154	100.0
<u>Nature and amount of work</u>		
<u>Own academic work</u>		
None	60	39.9
<20 h	56	36.4
≥ 20 h	38	24.7
A total of cases	154	100.0

<u>Other academic work</u>		
None	99	64.3
<20 h	35	22.7
≥20 h	16	13.0
A total of cases	154	100.0
<u>Non-academic work</u>		
None	78	50.6
<20 h	46	30.0
≥ 20 h	32	19.4
A total of cases	154	100.0

When we investigated the facts, a few misplaced ethics was observed. The sum of not their morals regarding the work variables was from top to bottom near: other abstract work 18 %, non-abstract work 14 % and own abstract work 5 %. When missing values turned out in the work variables with non-missing values in another work variable. The values were replaced by zeroes. For example, if a student had a missing value in “non-abstract work” and “other abstract work” and a non-missing value in “own abstract work”, the two missing values were replaced by zeroes to explain the situation that the student had only worked in own abstract field (Tuominen at all, 2015).

The relationships between the flora of work and gender/age were analyzed with irritable-organizations and devious chi square (χ^2) statistics. The connections between the total and flora of work and study success were first investigated by Anovas. Then, the outcome sizes were planned to use g^2 ethics on condition that by SPSS 16. The entity feedback form stuffs were not integrated in the investigates because they were unsurprisingly recognized to compare lofty near (Tuominen at all., 2015).

The factors model performed as the root for the organizational model for the representations. The autonomous factors (the factors associated to flora and quantity of work) were categorical in flora. Dummy factors had created, that the sort “no work” effective as a represent. The relapse factors connected to the factors testified under the model are so taken as representing from the situation value. The possessions of the autonomous variables on the product factors are explained as virtual to the situation variables (Tuominen at all., 2015; Hayes and Preacher, 2014; Katsikas, 2013).

The context used for the analyse were composed plus all autonomous variables in the unique prototypical. This was ended for plus all autonomous variables in one model and bookkeeping for their associations would have set the concluding $3^3 = 27$ groups with 26 variables. The associations are simple to current and construe to the study types.

A bias-corrected procedure was used for the standard errors of the model parameters that has been included in the models. Using bootstrap-grounded measures in the models is ideal because the selection circulation of the possessions cannot be presumed to be standard (Tuononen At All., 2015; Parpala And Lindblom-Yla`Nne 2012). The student’ tactics to knowledge were unhurried by a 12-item changed variety of methods to learning and cramming account in which they were inquired to designate when students could be cramming. A five-point likert scale (1 = totally disagree, 2 = disagree, 3 = no idea, 4 = agree, 5 = totally agree) was used. The features calculating the methods to learning and specimens of the substances were listed below (table 2).

Table 2 factors measuring the approaches to learning

Factor	Example item	Number of items
<u>Approaches to learning</u>		
Deep approach	I've carefully looked at evidence to reach my own conclusion about what i am studying	4
Surface approach	Much of what i have learned seems nothing more than many unrelated bits and pieces in my mind	4
Organised studying	On the whole, i've been quite systematic and organised in my studying	4

To analyse the reconnoiter that imaginable subnormal actions to the information's we analyzed the next of kin between working hours and work situation expending a capricious in place of complete volume of work. The anova results turned out a connection between quantity of work and work level ($f(3, 341) = 10.07, p = <0.005, g^2 = 0.03$). Student that worked lower than 20 h received more study credits per year ($m = 23.6, sd = 6.7$) than student who worked over 20 h ($m = 22.8, sd = 7.07$). Student with no work established more study level ($m = 27.1, sd = 7.8$) than student who worked more than 20 h ($m = 21.9, sd = 6.58$). The correlation between the flora of the work and study level was then explored ($f(3, 175) = 3.19, p = 0.0011, g^2 = 0.01$). Student who had much work as well as both own abstract and non-abstract works acknowledged more recognitions ($m = 25.1, sd = 6.9$) than student who had individual own abstract work ($m = 24.0, sd = 7.5$) or no work ($m = 23.2, sd = 6.6$) (Tuominen at all., 2015).

We focused the relationship between work and different background variables. The meaning associations between participants gender and total of working that not originate. Nevertheless, a connection was confirmed between the flora of work and gender, $v^2(3, n = 800) = 9.14, p = 0.068$. Female participants presented much diversity work counting the own abstract work and non-abstract works than to male student. Also, we found a relationship between the flora of work and age that $v^2(5, n = 716) = 48.62, p < 0.001$ (Tuominen at all., 2015). The findings presented us which the student who are under 24 years old had less own abstract work bigger student, but that the young student had more non-abstract work than older student.

Results

The outcome of this study explains that financial, common and pay conditions could not be similar in different countries, but it give the impression that comparisons on hand in work can sustenance student' knowledge period if working periods are comparatively not much. In this cram we understand that even though the instruction program organization is different from the supplementary republics, the outcome is unmoving in contour with the prior scholarships about this question (Tuominen at all., 2015). In conclusion, to scrutinize these comparisons and transformations in supplementary detail, more examination is desirable to compartment in numerous republics with dissimilar instruction and community classifications.

Student who worked not as much of than 20 h acknowledged supplementary education glories than that the person worked over 20 h per week. Moreover, the education created that non-working student established much education glories than student who worked a lot of hours, but which students didn't be different from student who worked lower than 20 h weekly. This mean that the education proved the subnormal connection between working hours and education accomplishment. Student who had both own abstract field and non-abstract works got more education credits than the student who only one type of work or no work (Tuominen at all., 2015).

We believe that this education presents an original standpoint to enquiry regarding the connection between working and education accomplishment by reconnoitering the characteristic of student' knowledge. It exhibited that student' knowledge developments are very imperative influence to analyses because they are interrelated to in cooperation student' education step and the environment of the work and this the through and unintended properties could have visions at the time methods to knowledge are added in the analysing in this concept (Tuominen at all., 2015; Naill at all., 2004). Also, the education proposes which by stressing student' operating abilities, additionally taking into account the very large perspective knowledge, student have good level to modify useful connections between work and educating, and, at the concern, work-modulated programmed would present more attractive environments to student' knowledge and give participants participate work to Vocational School activities.

References

- Barley, Z., Lauer, P., Arens, S., Apthorp, H., Englert, K., Snow, D., Akiba, M. (2002). Helping A-Risk Students Meet Standards: A Synthesis of *Evidence-Based Classroom Practices*, No. ED-01-CO-0006, Office of Educational Research and Improvement, Washington, DC.
- Broadbridge, A., & Swanson, V. (2006). Managing Two Roles. A Theoretical Education Of Student' Employment Whilst At University. *Community, Work And Family*. Doi:10.1080/13668800600586878.
- Hayes, A. F., & Preacher, K. J. (2014). Statistical Mediation Analysis With A Multi categorical Independent Variable. *British Journal Of Mathematical And Statistical Psychology*, 67(3), 451–470. Doi:[10.1111/bmsp.12028](https://doi.org/10.1111/bmsp.12028).
- Hovdhaugen, E. (2013). Working While Studying: The Impact Of Term-Time Employment On Dropout Rates. *Journal Of Education And Work*. Doi:[10.1080/13639080.2013.869311](https://doi.org/10.1080/13639080.2013.869311).
- Katsikas, E. (2013). The Impact Of Student' Working Status On Academic Progress: Assessing The Implications Of Policy Change In Greece. *Journal Of Education And Work*. Doi:[10.1080/13639080.2012.691606](https://doi.org/10.1080/13639080.2012.691606).
- Manthei, R. J., & Gilmore, A. (2005). The Effect Of Paid Employment On University Student' Lives. *Education Training*. Doi:10.1108/00400910510592248.
- Neill, N., Mulholland, G., Ross, V., & Leckey, J. (2004). The Influence Of Part-Time Work On Student Placement. *Journal Of Further And Higher Education*. Doi:[10.1080/0309877042000206705](https://doi.org/10.1080/0309877042000206705)
- Parpala, A., & Lindblom-Yläñne, S. (2012). Using A Research Instrument For Developing Quality At The University. *Quality Of Higher Education*. Doi:[10.1080/13538322.2012.733493](https://doi.org/10.1080/13538322.2012.733493).
- Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Yläñne, S. (2015). Work In Relation To Study Pace And Thesis Grade: Investigating The Mediating Role Of Student Learning. *Higher Education*. Doi: 10.1007/S10734-015-9937-Z.
- Ryan, M., Barns, A., & McAuliffe, D. (2011). Part-Time Employment And Effects On Australian Social Work students: A Report On A National Study. *Australian Social Work*. Doi:10.1080/0312407x.2010.538420.

The Consequences Arising from the use of Social Innovation in Small Schools of Thailand

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Abstract

Social innovation is the concept, processes, methods, or result from the creative in small school to make the change in the direction of improved effectiveness. The development model for learning and development needs of society by supporting the involvement of the society is divided into four components including 1) changes in society, 2) productivity, 3) creativity in methods, and 4) supporting the participation of society. This research aims to study the consequences arising from the use of social innovation of small schools. The methodology of the research is grounded theory research by understanding the phenomenon of social innovation for small schools from the perspective of the phenomenon and who is involved by means of a study into the field with in-depth interview, focus group discussion, documents analysis, observation, and field-note to get insight in all-round and through triangulation.

The results showed that : the consequences resulting from the use of social innovation, there are two levels: 1) The sequel to the external network, including civil society and the state to a stable, prosperous, sustainable, balanced social dimension, and equality and social justice, and 2) a sequel that takes place within the school, including cultural and creative performance, a community of creative, innovative and rich social intelligence, and quality of life and social values as well.

Keywords: *Consequences, Social Innovation, Small School, Thailand*

Introduction

Nowadays, among many technological advances and developments, we are encountering the time of rapid disruptive innovation changes that have never occurred before. Thus, small organizations with insufficient resources or limitations are able to take the challenge and make an impact in society, which corresponds to chaos theory (Boeing, 2016). This causes a change insubsystems of small organizations to affect bigger systems as in butterfly effect phenomenon (Guastello, 2013), which could stimulate sustainable growth of organizations using innovation and difference-making by participants struggling for new ways. On the other hand, we are also dealing with problems that are increasing, such as economic and social inequality, political and cultural controversy, or serious environmental problems. These problems are complicated and linked together; hence, efficient solutions require the key factor in order to creatively come up with a solution to social problems or to improve people's quality of life – that is, to develop “Social Innovation”, especially in educational system that determines to solve many problems in human society caused by cultural changes. Moreover, Thai society is likely to be an individual society (DawruwanThawinkarn, 2015). Therefore, social innovation is essential for school development to reach a goal of various, efficient, and inclusive educational reforms, which is coherent to community's potential development and school reform's goal (Gold&Brown, 2003). Additionally, the principle of the success of small schools should urge the creation of new projects that make them proud of their schools and believe that they can do different things (Ewington et al., 2008). Even though small schools have limitations, deficiencies, and many problems, some of them are trying to invent and develop innovations and administration models and manage education that is new, different, and suitable for needs. Conditions of the community's context bring cooperation from all social sectors together in order to build standard quality and unique differences to succeed in efficient and effective educational management and administration of small schools so that they can be accepted and be a good model of a good school, community, and society. This is considered challenging to the trend of changing in many dimensions, yet these schools still have courage because the heart of education is students. They are also determined to overcome their limitations, which is corresponding to McGregor (2007) that thinks many successful organizations around the world focus on the use of creativity of their staff to create an innovation in the organization and that creativity is related to every activity at work. This creativity and innovation are used widely and interchangeably. However, a concept of creativity is unique and clear, which is different from that of innovation (Howkins, 2009). That is, creativity is either an individual or a team process, whereas innovation is a process on the organization level. It is a successful use of creativity (Amabile et al., 2002) as well as a creative social innovation for small schools. In other words, concepts, process, methods, or inventions from society's creativity in small schools can improve the society effectively by enhancing thoughts, mind, and realisation, which can be developed into a learning and development model responding to the needs of the society supporting the social involvement. It can be divided into 4 compositions: 1) a change by society, 2) concrete product, 3) creative methods, and 4) support for society's participation.

Therefore, it is an issue to study the consequences caused by the use of creative social innovation for small schools from people involved. It is the research area using qualitative research, which is to seek knowledge from consideration of social phenomenon in real life in every dimension (Supang Chantavanich, 2014). It is Grounded Theory Research – a form of systematical grounded theory research by Strauss and Corbin (2015) to gain new knowledge to develop successful learning management. Furthermore, a finding found that small schools under the office of basic education have applied innovations to their learning, and some compositions and applications correspond with creative social innovation and are able to be applied in different contexts properly to develop a complete human resource – good, talented, happy, useful, generous, and smart, to be able to creatively bring happiness to mankind in the future.

Research Objectives

To study the consequences arising from the use of social innovation of small schools.

Literature Review

Consequences From The Use Of Creative Social Innovation

Prawase Wasi (2013) states that to develop a strong society using creative social innovation involves an educational system development for it is a big organization and its effects can cause changes. Creative social innovation is a concept and a process for presenting the important changes according to the needs of the community. Moreover, the usefulness of the creative social innovation is not only to increase the efficiency of the organization but also to develop the country for long high-quality life. Roger (2003) explains the consequences or impacts of creative social innovation that can change the society as follows:

- 1) to encourage value in the society
- 2) to solve problems or develop the society
- 3) to help improve people's daily routine in the community or society
- 4) to be able to give value and use effectively after comparing

Moulaert, Martinelli, Swyngedouw & Gonzalez (2005) mentioned the consequences or impacts in the social dimension of creative social innovation as follows:

- 1) respond to needs and necessities of human society
- 2) improve the society
- 3) increase social and political capacity and access to resources

Martinelli (2012) mentioned three impacts of the use of creative social innovation on the national level:

- 1) respond to the needs that human ignores from what they deserve
- 2) energize an individual or a group
- 3) improve social relationships

Kanjana Saenglimsuwan (2012) has summarized three consequences of creative social innovation as follows:

- 1) The effect of the creative social innovation to life quality is the increased capacity of the government and life quality of people from World Development Indicator database. The innovation helps reduce the mortality rate of newborn babies, increase people's longevity and potential, and improvement of state structure that is represented by Government Effectiveness and Control Corruption index.
- 2) The social innovation helps solve educational problems and start a production and development of new media as well as the development of the curriculum to increase entrance rate.
- 3) There is a study of dust in the air which affects people's health; it is concluded that the social innovation helps reduce the amount of air pollution by collecting data from World Development Indicator to compare the relationship between how much dust in the air and entrance rate. The social innovation decreases air pollution and increases entrance rate.

Additionally, Saimon (2014) talks about the consequences of the use of the social innovation which are:

- 1) Integration of cross-sectoral
- 2) New relationships
- 3) Great pro-consumption and co-production
- 4) Development from a grassroots level
- 5) Mutualism
- 6) Development of capacities and assets
- 7) Better use of assets and resources

In summary, the consequences of the social innovation are the increase of the capacities to access resources, human needs, moral, economic growth, healthier relationship, to solve corruption problem, to be a strong society, to have a better environment, to develop from grassroots level, to use resources effectively, and to produce a great product.

Research Method

This qualitative research (Chai Potisita, 2016) had three phases of data collection, as follows.

- 1) The researcher reviewed 150 documents relating to social innovation to obtain data on components of social innovation. The simple random sampling method was used to select the papers reviewed for this research.
- 2) The researcher conducted in-depth interviews with 10 social innovation experts, including school directors, academics, and researchers involved in social innovation development.
- 3) Data were collected from 5 small schools that had been awarded national prizes and that had been named master schools with impressive social innovations. The schools were selected using purposive sampling in order to ensure they represented the values of good social innovation within schools and to confirm that they had been able to introduce positive changes within their communities.

The data collection process involved field data collection, decoding of the school's successful practices, interviewing school stakeholders, and summarizing the data, with the purpose of offering recommendations for the consequences arising from the use of social innovation of small schools.

Results And Discussion

Findings on the consequences arising from the use of social innovation of small schools.

1. consequences in external network

1.1 public network for society and stability

The high-quality community is enthusiastic to continuously improve itself, follow the changes, and preserve its identity. Services from the government have high-quality and good governance on all levels; people also have an opportunity to participate, which make them feel a sense of belonging and cherish it. This then builds bonds, responsibilities, and the need to work to develop the society and schools from the belief and acceptance of the organization's goals and values. They would feel that they are a part of this organization or society, and they would be willing to work to maintain their organization and reach its goals.

From such situation, it shows determination and desire to improve the society and gain people's acceptance of the organization through teamwork and everyone's involvement in order to step into the new generation of the strong, wealthy, and sustainable society.

1.2 Social balance

When using strategies to drive social innovation until it becomes successful in small schools, they can maintain as well as the community or society will balance – there are a giver, a receiver, and discipline; there are fewer problems in the society and more of creativity. Normally, a good balance of the society should bring civilization and justice to all area. Socially, there should be a balance between groups and classes – the balance that focuses on equality and prestige of human. Effective administration is a result of learning and emphasis of balance in the workplace especially the ability to manage limited resources such as budget, material, staff etc., to reach the goals through a neat process and effective use of resources.

1.3 equality and social justice

To establish equality, people with the least number opportunities should receive support the most; the ones with advantages do not have to receive as much support, but should give more to those who do not have as much as them. In today's society, equality in a political implication tells that everybody in the society is equal in every way so people can live together peacefully. Inequality is the cause of many conflicts in the society, and it is a matter that we are aware of as well as understand that inequality is natural in the society because of unequal treatment. This has to be perceived seriously as people are basically different especially their bodies, minds, emotions, statuses, and roles in the society. These differences are natural problems that prevent equality although we are naturally different. However, we, as human beings, have rights as many as others, which is an important factor when living together in the society. Furthermore, as we are in the society with the democratic government, human equality is undeniably important. Equality means equal rights to receive services from the government; thus, a state with the democratic government has a responsibility to provide equal opportunities so that the people have access to its services. However, people's basic differences are a problem to the government services access. Without a good management, the gap of the inequality will occur and it will be difficult to understand.

2. Consequences within schools

2.1 creative culture and high potential organizations

To build a social innovation, it is to put a value on organization level reflecting from behavior and attitude of the staff in the organization that encourages a development of new work. Creativity in a team is for objectives achievement of the organization, which has to be from a cultivation of creative concept and a creation of an atmosphere in a workplace that stimulates creativity. The director must encourage and support teachers and staff to willingly bring their creativities into practical use to develop an ability to become the organization of innovations – to work efficiently without too strict control.

2.2 Community of innovations and the creation of a knowledge-based society

The 21st century is an age that information travels quickly resulting in new knowledge and technology all the time. It can be called the age of a knowledge-based society. Moreover, it is also the age of the economic competition, wisdom investment, and innovation creation that do not happen only in the country but on regional and international level as well. From these changes, educational organizations and teachers are expected to play an important role in solving social problems and develop the youth to become an efficient human resource with satisfactory qualifications so that they can compete on international level. This is corresponding with National Education Act B.E. 2542, which intends to produce good, talented, and happy students. Hence, it is a challenge to improve paradigm in educational administration by managing a more efficient school administration especially in human resource development, which is considered a valuable resource. The focus is also on to raise the value of staff in the organization to become a human resource, which is the heart of the development and building a happy organization or school. This then can become a tradition of an educational organization's happiness along with a tradition of efficient work, which advantages both to an individual in a better quality of life and to the organization itself in effectiveness and productiveness of the work. It is the consequence of the cooperation of the staff within the organization – to work together with enthusiasm, love, and bond toward the organization, resulting in good work evaluation and fame. The students will also learn and benefit from the teachers who are dedicated to their work because of the happiness built in their organizations.

2.3 Quality of life and good social value

An improvement of life quality is everyone's desire as well as the society in order to live happily and peacefully together. Therefore, the improvement of life quality is a basic improvement starting from ourselves – improve the lifestyles following the changes in the future, improve mental health, control emotions to be happy and optimistic, not stressed or anxious about schools or work, gain acceptance and admiration from society, respect the sense of belonging and the need to be a part of the society, learn new skills to know and understand more, and be creative in problem solving. Thus, the improvement of life quality involves every individual, community, and society; it is necessary to build a balanced system and maintain it under social changes because a good life depends on a happy society. At the same time, an efficient society depends on quality people as well.

Conclusion

When a school uses a strategy to drive social innovation successfully, its consequences affect both the organization itself and the staff or related matter as well as the influences of the contextual and intervening conditions, which are the consequences of the use of social innovation in small schools. It is composed of the consequences toward external network which are: (1) the network of civil state for society, stability and sustainability, (2) social dimensional balance, and (3) social equality and justice. In addition, there are consequences occurring within schools themselves: (1) creative tradition and high potential organization, (2) the creation of the society and to be the community of innovation, and (3) better life quality and social value.

The consequences of the social innovation use for small schools can be applied to strengthen their strong points, improve their weak points, and for more completion of the innovation in order to be a model of an effective and efficient small school administration. This happened after the cooperation of the government and private organizations, society and individuals who have the same belief that everyone is responsible for a good educational system resulting in a network that works together to also change the social concepts and make the public realise the power and ability to help change the education from where they are. Finally, this power is believed to put pressure until a change happens in Thai educational system to truly serve the demands of Thai people.

REFERENCES

- Amabile, T. M., Mueller, J. S., Simpson, W. B., Hadley, C. N., Kramer, S. J., & Fleming, L. (2002). **Time pressure and creativity in organizations: A longitudinal field study.** Working Paper, Harvard Business School, Boston, MA.
- Boeing, G. (2016). "Visual Analysis of Nonlinear Dynamical Systems: Chaos, Fractals, Self-Similarity and the Limits of Prediction." *Systems*, 4 (4), 37.
- Chai Potisita. (2016). *Science and Arts of Qualitative Research*. 7th ed. Bangkok, Amarin Printing.
- Dawruwan Thawinkarn. (2015). *Teaching Materials : National Economic Development Plan*. Course on Policy Analysis and Educational Management, Educational administration, Faculty of Education, Khon Kaen University.
- Ewington, J., Mulford, B., Kendal, D., Edmunds, B, .& Silins, H. (2008). Successful School Principalship in Small Schools. *Journal of Educational Administration*. 46(5) : 545-561.
- Gold, E.,Simon. & Brown, C. (2003). Reframing Accountability for Urban Public Schools.

- The Evaluation Exchange*. 9(2):10-12.
- Guastello, S.J. (2013). *Chaos, Catastrophe, and Human Affairs: Applications of Nonlinear Dynamics to Work, Organizations, and Social Evolution*. Psychology Press: New York, USA.
- Howkins, J. (2009). *Creative Ecologies: Where Thinking Is A Proper Job*. University of Queensland Press, Australia.
- Kanjana Saenglimsuwan. (2012). Social Innovation : More value than you can imagine. *Executive Journal*. 32(3), 12-15.
- Martinelli F. (2012). *Social innovation or social exclusion ? Innovating social service in the context of a retrenching welfare state*. In Franz, H-W., Hochgerner, J. & Howaldt, J. (eds.). *Challenge Social Innovation : Potentials for Business, Social Entrepreneurship Welfare and Civil and Society*. Berlin and Heidelberg : Springer Berlin Heidelberg.
- McGregor, D. (2007). *Developing Thinking; Developing Learning*. Open University Press, England.
- Moulaert, F., Martinelli , F., Swyngedouw , E., & Gonzalez , S. (2005). Towards Alternative Model (S) of Local Innovation. *Urban Studies*. 42 (11), 1969 – 1990.
- Prawase Wasi. (2013). *Social innovation with national development*. Bangkok, Office of the Fund Health promotion.
- Rogers. Everett, M. (2003). *Diffusion of innovations*. 5th ed. New York. Free Press.
- Simon T. (2014). *Social Innovation for Public Service Excellence*. UNDP Global Center for public Service United Nation.
- Strauss, A. & Corbin, J. (2015). *Basics of qualitative research: techniques and procedures for developing grounded theory*. 4th ed. Los Angeles, CA: Sage.
- Supang Chantavanich. (2014). *Qualitative Research Methodology*. 22nd ed. Bangkok, Chulalongkorn University Press.

The Development Of Students' Desirable Characteristic For Private Elementary School

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Abstract

The desirable characteristic of students is essential as well as the knowledge that they learned from the school because the society does need not only the genius but also the good person. The study aimed to study the realistic basis and desirable characteristic of students in the perspective of teachers in private elementary school, and develop the desirable characteristic of students through action research methodology at the sample school to suit the context. The procedure was divided into two phases; phase I: studied the problems and the developmental needs of the desirable characteristic by using questionnaires; phase II: designed and developed the desirable characteristic of students based on the results from studied, conducted with focus group discussion methodology and experimentation with students. The result of this research founded that the desirable characteristic of students was increased after finished the process.

Keywords: *Desirable Characteristic, Elementary Students, Private Elementary School*

Introduction

Nowadays, the private schools have the critical role in Thai education, to manage the education level from the early childhood level to the higher education level (Office of the Private Education Commission, 2015). Thereby, the quality of education was crucial for them. The indicators that can be told about the quality were students. All academics must develop educational quality. Schools should also develop their operation and reveal their operational results to the community or stakeholders, to reassure parents and communities that they will get the best quality from the school.

Youth is the critical resource, as hope and future of the nation. The prosperity and development of the nation will be increased or not were depended on the quality of people. The present social conditions were changed regarding economic, political, social and technological, and they were affected to the youth's development (Chareonwongsak, K., 2014) because they will learn everything from their surroundings and absorbed them unconsciously. Then they were developed into the characteristic of themselves. Each people have the personal characteristic that can remember and identify by the others (Meador, D., 2018), if they have the desirable characteristic, they will gain the self-confident and can be a person who was accepted by the society and also can succeed their life in the future.

The enhancing of the desirable characteristic should cultivate with the all ages students, (Peeters, J., 2016), especially in the elementary school. Because they are the beginner to learn anything, if they were learned the good things from the beginning, they were affected to be the good students (Chaisongkam, S., 2013). Therefore, the elementary schools are the essential organizations to cultivate desirable characteristics for the students. It was imperative to have the corporate sponsorship from the related organizations, include communities, temples, and parents to be the vital role in cooperating to successful them.

In fact, it was founded that some students have the impolitic characteristic and demeanor. Especially, speech and responsibility. The researcher realized the importance of the issues mentioned above. Therefore, the researcher has begun this research to develop the desirable characteristic of students, to guide the development of the quality of students by using action research methodology. (Kemmis and McTaggart, 1988) The experimentation process that worked for this research took place at Phatharadon School, in Roi Et province, Thailand.

Objectives

This research aimed to;

1. Study the realistic basis and desirable characteristic of students in the perspective of teachers in private elementary school.
2. Develop the desirable characteristic of students through action research methodology at the sample school to suit the context.

Limitations

The sample of this research in the first phase were 293 teachers of the private elementary school in Roi Et province, and they were randomly selected from the formulated by Yamane's technique from the 1095 population size. The second phase, the participants were 22 teachers and 392 students from Phatharadon School in Roi Et province.

The instruments of this research were 1) the questionnaire of students' desirable characteristics and 2) the activities that were set together by the teachers under the action research methodology.

Variables Under The Study

The 6 Aspects of students' desirable characteristics obtained through the synthesizing process from the study of 6 resources about the desirable characteristics of students. The researcher compared each resource if they were the same three items or more, it was chosen to be the variables of this research. Finally, the variables consisted of Diligence, Frugality, Discipline, Patriotism, Honesty, and Service Mind, the following table shows how the students' desirable characteristics were synthesized.

The Aspect of Students' Desirable characteristics	Desirable characteristics of students' resource						Frequency
	5 Basis Values of the Office of the National Culture Commission	Desirable characteristics under the core curriculum	12 Values Announced by the Head of the National Council for Peace and Order (NCPO)	9 Basic Virtues by the Ministry of Education	10 Characteristics of Great Students	10 Characteristics of a Successful Student	
1) Diligence	✓	✓	✓	✓	✓	✓	6
2) Frugality	✓	✓	✓	✓		✓	5
3) Discipline	✓	✓	✓	✓			4
4) Religious	✓		✓				2
5) Patriotism	✓	✓	✓				3
6) Honesty		✓	✓	✓			3
7) Service Mind		✓	✓	✓	✓	✓	5
8) Grateful			✓	✓			2
9) Preserve culture		✓	✓				2
10) Democracy behavior			✓			✓	2
11) Conscious			✓				1
12) Good mental and healthy			✓				1
13) Polite and respect others.				✓		✓	2
14) Cleanness				✓			1
15) Unity				✓			1
16) Like to ask questions					✓		1
17) Leadership					✓		1
18) Problem solved					✓		1
19) Supported					✓		1
20) Credible					✓		1
21) Responsibility						✓	1

Methodology

This research process was divided into 2 phases;

Phase I: Studied the problems and the developmental needs of desirable characteristic.

The researcher began by surveying the needs and problems of students' desirable characteristic by using questionnaires. In the next step, the researcher participated in focus group discussion with the four private schools that belong to Roi Et province.

Phase II: Designed and developed the desirable characteristic of students.

The researcher chose a private school to develop and experiment with the students, the criterion of selection included 3 conditions; 1) the school was assessed by the Office for National Education Standards and Quality Assessment (ONESQA) in the third round and passed this assessment, 2) the school administrator had graduated in master degree or above in the major of educational administration, and 3) the school had allowed the researcher to experiment the process of research with their students.

After the considered of criterion above, Phatharadon school had allowed the researcher to experiment the research process in their school. Then, the researcher began to summarize the information from questionnaires and a focus group discussion in the first phase. When finished, the researcher participated in a focus group discussion, again with nine teachers in the school where was chosen, during the focus group, the teachers set the indicators and prepared projects together to support the indicators that were chosen based on the results from the study in the first phase. They also can develop the desirable characteristic of students under the indicators chosen by teachers through action research methodology, including plan, act, observe and reflect. (Kemmis and McTaggart, 1988)

Results

The results of the questionnaires on problems and needs for development showed that the overall of the desirable characteristic of students' problems was in a medium level when considering individual aspect in ascending order, there were service mind aspect, discipline aspect, and honesty aspect respectively. Moreover, the needs of development were in a high level, when considering individual aspect in ascending order, there were service mind aspect, discipline aspect, and honesty aspect also.

The Aspect of Students' Desirable characteristics	Problems			Need to Develop		
	\bar{x}	S.D.	Meaning	\bar{x}	S.D.	Meaning
1) Diligence	3.10	.34	Medium	4.12	.31	High
2) Frugality	3.13	.41	Medium	4.11	.33	High
3) Discipline	3.35	.36	Medium	4.35	.28	High
4) Patriotism	3.16	.39	Medium	4.27	.34	High
5) Honesty	3.17	.38	Medium	4.28	.33	High
6) Service Mind	3.38	.41	Medium	4.43	.25	High
Total	3.21	.16	Medium	4.26	.12	High

Furthermore, the results from the focus group discussion of the teachers in private school where was chosen showed that the desirable characteristic should be developed to focus on the discipline aspect and service mind aspect to solve the problems, especially on the issues of punctual, endurance, environmental protection, sacrifice and working with other. Finally, all of the teachers agreed with the overview of the process.

The teachers together set 4 indicators from 2 Aspects to development process:

- 1) The number of discipline promoted activities organized.
- 2) The percentage of students who were disciplined.
- 3) The number of activities that were organized to encourage students to learn and work together and
- 4) The percentage of students who had a service mind.

The Aspect of Students' Desirable characteristics	Project Name	Number of Indicators	The indicators that were set by the teachers
1) Discipline	1) Students' discipline enhancement.	2	1) The number of discipline promoted activities organized. 2) The percentage of students who were disciplined.
2) Service Mind	2) Students' service mind enhancement.	2	3) The number of activities that were organized to encourage students to learn and work together. 4) The percentage of students who had a service mind.

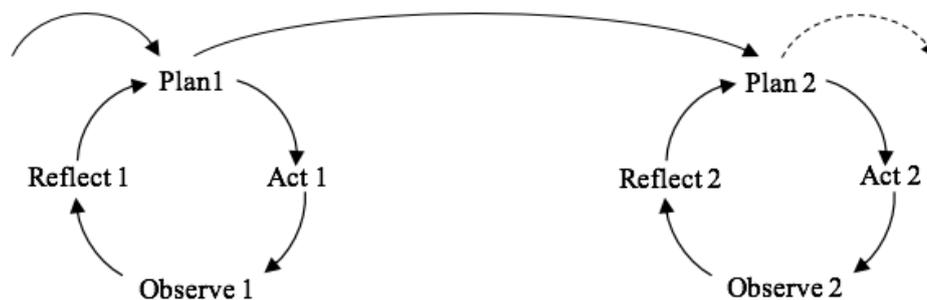
Then the researcher and all the teachers developed all indicators under action research methodology. This is an example of an indicator development;

Indicator 2: The percentage of students who were disciplined.

Project name: Students' discipline enhancement project.

Activities: 1) The training of students by the military program.

- 2) Responsible areas' organizing for the environmental protection.



Development Operation: Loop 1	Development Operation: Loop 2
Plan: Prepare the project; set the project organizers; set project period; communicate to the military organization to invite their staff. Plan and set the training programs together with the military staff and the teachers.	Revise Plan: The teachers set the activity together. (They organized the responsible areas for each group of students for the environmental protection); set the period for the participation of students; prepare the materials and set the project organizers.
Act & Observe: The operation followed the training program that was chosen; interviewed the military staff and the teachers who participated in this project about the cooperation and behavior of students.	Act & Observe 2: The operation followed the activity programs that were set together; observe the behavior of the students; interview the teachers again and use the questionnaire on students' discipline satisfaction.
Reflect: Teachers were satisfied with their students who participated in the activity, some teachers need to set other activity that controls by themselves only. In the first period of the project, they could participate in only one activity. Recommend: Should let all teachers together set the activity by themselves without staff from outside.	Reflect 2: All teachers were satisfied with their students' behavior of discipline and needed these activities every year; focus on the participation of teachers and staff from outside, both activities suit all students. Recommend: Should set more types of activity; the school director should support the activity that set from the teachers focus on the students' behavior enhancement.

The result of other indicators showed that: Indicator 1 and 2: students were more disciplined than before and the school area was cleaner, the atmosphere was better. Indicator 3: students learned more and worked together better, and the relationship among the students was better, and some students showed leadership qualities, and indicator 4: the students were more service mind, the relationship among the students was better. The following table summarizes the success of all indicators.

Indicators	Targets	Results	Conclusion
1) The number of discipline promoted activities organized.	2 activities	2 activities	Successful
2) The percentage of students who were disciplined.	90%	95%	Successful
3) The number of activities that were organized to encourage students to learn and work together.	2 activities	2 activities	Successful
4) The percentage of students who had a service mind.	90%	80%	Unsuccessful

This concluding table showed that three indicators were successful and one indicator was unsuccessful. Although some indicators were unsuccessful, all indicators were developed under the action research methodology and showed increased quality.

Conclusion And Discussion

The needs of development showed that the service mind aspect and discipline aspect was in a high level, because of some students still focus on their benefit as the primary objective, if they satisfy they will do. On the other hand, if they cannot gain some benefits from them, sometimes they will refuse to do. That is the reason why the teachers should enhance them about the service mind. The process begun from the researcher and teachers participatory about the expected activities and targets, the designing of this process was based on the problems according to Weir (1974), and the development operations were driven under action research methodology of Kemmis and McTaggart (1988); finally, the almost activities were accomplished.

From the four indicators that were identified by the teachers founded that three indicators were successful. However, all indicators were developed and showed the desirable characteristic of students were increased. This was because the teachers design the activities suited with the contexts of school (Feeney, Christensen and Moravick, 1987), and allowed the students developed themselves from the real practice was consistent to the principle of learning by doing of Dewey (1972).

The results were also according to Ramitanont (2018), who identified that the characteristic was not something that accidentally or naturally occurred, but that the students' culture formed them under the process over time, and that the culture was a society of students construct and together developed themselves. It eventually became a circuit of culture how the students treated each other. In addition, there are some of the educators who see that culture directly related to the characteristics. They supported the view that cultural patterns in each school result from teaching and training at an early age (Benedict, 1970), that was the reason why their characteristics were developed.

Recommendations

From the variables, only two aspects of 6 were developed. In the future as many aspects as possible should be developed. Furthermore, this research was only conducted over one semester. In the future, research should be conducted at least more than one academic year.

Acknowledgements

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References

- [1] Benedict, R. (1970). **Thai Culture and Behavior**. Southeast Asia Program, Department of Far Eastern Studies. Cornell University Press: Ithaca NY.
- [2] Chaisongkam, S. (2013). **Management Strategies for Developing Desirable Characteristics of Elementary School Students in Schools under the Office of Basic Education Commission**. Bangkok: Faculty of Education Journal. Phranakhon Rajabhat University. 41(4): 162-179.
- [3] Chareonwongsak, K. (2014). **The Desirable Characteristics and Future of People in Thailand**. Bangkok: Office of the Education Council, Ministry of Education.
- [4] Dewey, J. 1972). **Experience and Education**. New York: Collier Books.
- [5] Feeney, S., Christensen, D. and Moravick, F. (1987). **Who Am I in the Lives of Children**. 3rd ed. Ohio: Merrill Publishing Company.
- [6] Kemmis, S., & McTaggart, R. (1988). **The Action Research Planner** (3rd ed.). Geelong: Deakin University Press.
- [7] Meador, D. (2017). **Characteristics of Great Students**. Top Pupils are Motivated and Hard-working. (online). Retrieved September 8, 2017, from <https://www.thoughtco.com/perfect-student-characteristics-41886.html>
- [8] Office of the Private Education Commission, Thailand. (2015). **The Report of Action Research to Development of Internal and External Quality Assurance System in Private Schools**. Bangkok.
- [9] Peeters, J. (2016). **Teacher Differences in Promoting Students' Self-Regulated Learning: Exploring the Role of Student Characteristics**. Learning and Individual Differences Volume 52: 88-96.
- [10] Ramitanont, C. (2018). **Identity, Culture, and Changing**. (online). Retrieved February 12, 2018, from <http://www.soc.cmu.ac.th/wso/data/identity>.
- [11] Weir, J. J. (1974). **Problem Solving is Everybody's Problem**. Science Teacher. 4: 16-18.

The Effect Of Blended Learning With Think-Pair-Share Technique To Enhance The Information Literacy Skills Of Rajabhat University Students

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Abstract

The variety of the information is important for 21st century students who were growing up together with technology, and they should know how to apply it to their learning. This study aimed to the comparison of students' information literacy skill using the blended learning with the Think-Pair-Share technique before and after learning of Rajabhat University students, and study of students' information literacy skill through the using of the blended learning with the Think-Pair-Share technique of Rajabhat University students. The procedures of the blended learning with Think-Pair-Share technique were as follows; phase I: define the challenging problem from the classroom and the online resources; phase II: Brainstorming and discussion in the topic of the issues that they found; and phase III: sharing and publicizing the knowledge from the media that they created. The result of this research found that the information literacy skills of students after used the blended learning and Think-Pair-Share technique higher than before began the process.

Keywords: *Blended Learning, Think-Pair-Share Technique, Information Literacy Skills*

Introduction

The variety of the information is important for 21st century students who were growing up together with technology, for example, computer, network, and technology literacies and they should know how to apply it for their learning and to gain the information in the format of image, sound, and text as the new media or new technology under the era of rapid change (Kathleen Tyner, 2014).

National Science and Technology Development of Thailand need to enhance the Thai student's skill of information communication technology (ICT) and internet using, screening the information under the reason, communicated skill and presentation skill. In addition, The Thailand Qualification Framework for Higher Education (TQF) focus to enhance the student skill of interpersonal skill and communication and information technology skills to support the working market in the future (Sinlarat, P., 2010).

Consistent of the faculty of education in Thepsatri Rajabhat University (TRU) that created the teacher who can use and select the information under the reason, self-expression, accept the opinions from the other, and be in the community happily. The instructional management in the university that brings the concept of learning both Face-to-Face in the classroom and teach them through the internet as known as the blended learning (Curtis J. Bonk, Charles R. Graham, 2013). This concept can help the students learn through the technology, practice to the selection of the various types of information and bring the data that were learned to have the discussion both inside and outside the classroom. Moreover, the teaching technique of Think-Pair-Share can give them the opportunity to practice and receive the information back from their friends in the classroom (Frank Lyman, 1987), the knowledge sharing of classmate increase the courage of counseling and presentation their work.

For that reason, the method that encourages students to access resources, identify and refer the sources, evaluate the information and apply it efficiently by using the blended learning and the Think-Pair-Share technique to enhance the literacy skills of students in Rajabhat University.

Objective

This study was aimed to;

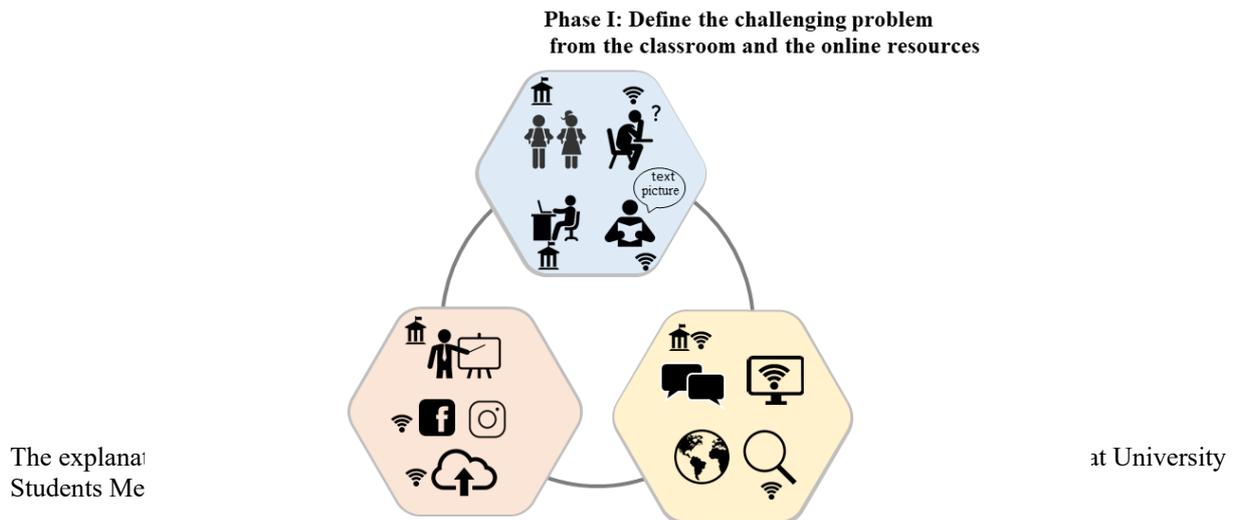
1. Comparison of students' information literacy skill using the blended learning with the Think-Pair-Share technique before and after learning of Rajabhat University students.
2. Study of students' information literacy skill through the using of the blended learning with the Think-Pair-Share technique of Rajabhat University students.

Limitations

The sampling group of this research was 52 students who were programming in English education, who were studying “innovation and information technology in education” course in the second semester of 2017 academic year at Thepsatri Rajabhat University. The sample of this research was from a purposive technique. The samplings were paired to twenty-six, for each is two students and take part in any activities provided in the study and create the media about the own infographic. The instruments of this research were; 1) Information literacy website, and 2) information literacy skills test form.

Methodology

The research process of the blended learning with the Think-Pair-Share technique was divided into 3 phases as follows; Phase I: Define the challenging problem from the classroom and the online resources; phase II: Brainstorming and discussion in the topic of the issues that they found; and phase III: Sharing and publicizing the knowledge from the media that they created.



The explanation
Students Me

Phase I: Define the challenging problem from the classroom and the online resources
This is the first phase where the teacher explained the role of student, then the students chose the buddy voluntarily to be the helper, began with the teacher explained the role of student, then the students chose the buddy voluntarily to be the helper, discussed and shared ideas about the topic that was assigned. Next step, they designed and created the infographics for each of them from the challenging topic, to the planning step for identified the scope of contents, knowledge pursuit, data format, information sources consideration, and the instrument that use to find, including the assessment of their necessary skills to create the infographics. After that, the students explained their plan in the report and uploaded it to the teacher's website for the data discussion, and assessed their skills in the scope of working with their buddy in the classroom.

Phase II: Brainstorming and discussion in the topic of the issues that they found
In this step, the students practiced the activity on the internet and studied the contents of how to search for information effectively and the principles of infographic media design. Then, the students search the information through the method that they found by identify their source, identify the methods used to search information, identify the website, data found types such as message, image, video, and sound, the technique of data searching and how to select the credible information and useful. Next step, shared the method how to search and select the information for used it in their infographic with the buddy. All of the methods in this phase, there was the communication among teacher students and their buddy both within the classroom, on the internet and social network. When all the students came into the class, they were brainstorming and discussion on the topic of the issues that they found

Phase III: Sharing and publicizing the knowledge from the media that they created
The last step of this research, after the students finish their infographic in the second phase, they presented their work and explained it in the classroom about the concept of design and the information selection for created their work. Then, they discussed the presentation of the classmate and recorded the video clip for upload to the network. In the part of each work of infographic, the students had published their work on the social media, such as Facebook, this is an opportunity for people to gain the knowledge from their work through pictures. After two weeks, the students uploaded their work and the results of publishing in the social media, and then they analyzed how the others feedback about their work from the social media.

The role of teacher and students in the blended learning process

The role of teacher	The role of students
Face-to-Face	Face-to-Face
<ol style="list-style-type: none"> 1. Clarified the rules and procedures, such as single activity, buddy activity, activity in the classroom, and activity on the network. 2. Designed of activity in the classroom, each couple of students shared ideas and exchanged the information from the source of documents and on the internet. 3. Gave the instructions, reflective of ideas by face to face with the activity in the classroom 	<ol style="list-style-type: none"> 1. Random selection of the topic that students had been assigned to find out the relevant information about the innovations, to challenge the ability of the students. 2. Pair with the other students as the buddy to work together and assigned the role of themselves. 3. Shared the ideas of the information that each student received from their study between the buddies. 4. Presented each students' work and discussed together, then record the video clip for upload to the network.
Online	Online
<ol style="list-style-type: none"> 1. Determined the sequence of online activities. 2. Designed the activity and assigned the task for students 3. Evaluated the results of activity and the students' work. 	<ol style="list-style-type: none"> 1. Communicated with their teachers as the consultant and receive the instruction through the network. 2. Study the contents, participated in the activity, completed the exercise within the lesson on the network.

Findings

The effect of blended learning with Think-Pair-Share technique to enhance the information literacy skills of Rajabhat University students, after using the Think-Pair-Share technique had the Information literacy skills increased, the details of it as shown in the table below.

Range	Number of Students		Percentage		Meaning
	Before	After	Before	After	
28 – 36 points	0	13	0	25	Highest
19 – 27 points	0	37	0	71.15	High
10 – 18 points	21	2	40.38	3.85	Medium
0 – 9 points	31	0	59.62	0	Low

The above table result showed that before used the Think-Pair-Share technique found that, 31 students (59.62%) had the low level of Information literacy skills, and 21 students (40.48%) had the medium level of Information literacy skills. However, after used the Think-Pair-Share technique had the Information literacy skills increased, there were 37 students (71.15%) had the high level of Information literacy skills, and 13 students (25%) had the highest level of Information literacy skills.

The Information literacy skills of students had overall in the high level, as shown above, this skill was assessed including 12 sub-skills that synthesized from Sconul (2011), NSTDA (2015), Michael and Robert (1987), and the association of college and research libraries (2000). There were 12 sub-skills consisted of 1) ability to determined scope of topic for information searching, 2) ability to determine the sources of information searching, 3) ability to topic identifying for searching and wording selection that clearly and easily to understand, 4) responsibility for information searching under the time limit, 5) ability to identify what they need to find more, 6) ability of using tools for information searching, 7) ability to identify and searching the variety of information format to utilize, 8) ability to consider, select, and evaluate the credibility of information, 9) ability to identify the sources of information for correct reference, 10) ability to design for information presentation appropriately, 11) ability to select the tools for publish the information appropriately, and 12) ability to solve the problems and obstacles encountered during the operation.

Conclusions

1. The comparison of information literacy skills by the blended learning and Think-Pair-Share technique, found that the information literacy skills of students after used the blended learning and Think-Pair-Share technique higher than before used it, this might be the cause of the information literacy skills can practice to increase it by applied the process and merge to the learning curriculum, contents selection, and the activities that allow students to practically, according to Scott and Sullivan (2005), Daniel, Dominique and Kraemer (2014), said that information literacy skills are the things that the teacher can integrate into the curriculum because the credible of data searching, to enhance them to learn and apply it to work in the future.

Corresponded with the research of Michael (2008), stated that the information literacy skills is essential in the present, it can help us to search, evaluate, and use the information we need, and filter unwanted data in the

overwhelming information world, to select it to use as much benefit as possible. However, the information literacy skills can be learned through the learning process and affected to the success of the activity is the task identified clearly, defining of objectives searching, using of tools and resources appropriated, and the decision of data selection. The skills that were mentioned above are necessary for the students in the university to learn before they will work in real life. It can be seen that if the teachers designed the appropriate instructional activities, they would be able to improve the student's information literacy skills more than before.

2. The information literacy skills of students overall were in the high level, this might be the cause of the step design of blended learning and Think-Pair-Share technique that focus on the benefits of learning by using technology and the tools for access to the information, the contents of lesson, communication channel, interaction between teachers and students, or among students quickly. According to the research of Habidge, Sanderson, and Tin (2015) that studied about the using mobile technology to enhance undergraduate student digital information literacy skills with group Canadian case study founded that students feel challenge when collaborative or exchange the opinions according to think-pair-share technique that can enhance the discussion of the students until the presentation step, including the face-to-face learning, that increase the opportunity for students to had the reflection together, share ideas with classmate, knowledge sharing, learn from the other perspective to develop the skills of student.

According to Bill Johnston & Sheila Webber (2003), studied about the information literacy in higher education founded that, the success of students in information literacy skills development was from the operation both in the classroom and outside, and allowed the students had the participation in the classroom, decision making, and evaluated their work and classmate, these can motivate the students to operated and develop themselves. In addition, the Think-Pair-Share technique that the students shared ideas and consulted with their buddy, can encourage the learning under the target of each student, and controlled themselves to operate in the activity.

It's also in conformity with the research of Houtman (2015) that studied the motivation of students learning by using the Self-Regulated Learning for the information retrieval, found that the using of Think-Pair-Share technique in the activity can open-minded of students and express their opinion among the classmate more than communicated directly with the teacher, and efforted to operate the activity for information searching, listening and learn from other work to improve their work better. From this process that was mentioned above, affected to increase the student's skill of information literacy.

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References

- [1] Bill Johnston & Sheila Webber. (2003). **Information Literacy in Higher Education: A review and case study**, Studies in Higher Education, 28:3, 335-352
- [2] Curtis J. Bonk, Charles R. Graham. (2013). **The Handbook of Blended Learning: Global Perspectives, Local Designs**.
- [3] Daniel, Dominique and Kraemer, Elizabeth W. (2014). "Integrating the Credit-Bearing Information Literacy Course into the Curriculum: Goals, Benefits, and Challenges." **LOEX Conference Proceedings** 2012. 6. Retrieved June 1, 2018, from <http://commons.emich.edu/loexconf2012/6>.
- [4] Hanbidge, Alice Schmidt; Sanderson, Nicole; Tin, Tony. (2015). **Using Mobile Technology to Enhance Undergraduate Student Digital Information Literacy Skills: A Canadian Case Study**. IAFOR Journal of Education, spec. ed. p108-121 Sum 2015
- [5] Houtman, Eveline. (2015). "Mind-Blowing": Fostering Self-Regulated Learning in Information. **PDXScholar: Communications in Information Literacy** 9(1), Iss. 1 pp.6-18
- [6] Kathleen Tyner. (2014). **Literacy in a Digital World Teaching and Learning in the Age of Information**. 1st Edition: New York. Routledge.
- [7] Lyman, F. (1987). **Think-Pair-Share: An Expanding Teaching Technique**: MAA-CIE Cooperative News.

- [8] Michael B. Eisenberg. (2008). **Information Literacy: Essential Skills for the Information Age**. DESIDOC Journal of Library & Information Technology, Vol. 28, No. 2, March 2008, pp. 39-47
- [9] National Science and Technology Development of Thailand. (2018). **Four aspects of information literacy**. Retrieved April 16, 2018, from <https://www.nstda.or.th/th/>.
- [10] Sinlarat, P. (2010). **Thailand's Qualifications Framework for Bachelor's Degree (TQF)**. Retrieved April 16, 2018, from www.onesqa.or.th/onesqa/th/file/.../3-1600-Pitoon.pdf.
- [11] Scott, Thomas J, O'Sullivan, Michael K. (2005). **Analyzing student search strategies: making a case for integrating information literacy skills into the curriculum**. Teacher Librarian; Bowie Vol. 33, Iss. 1, (Oct 2005): 21-25.

The Effect Of Essential School Leadership On Innovative Organization Of Thai Secondary Schools

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Abstract

This research aimed to examine linear structural relationship model of essential leadership styles of school administrators in promoting organizational innovation of basic secondary schools in Thailand. This is followed up with development of an approach for innovating school organizations. Researchers employed a mixed mode design using a combination of quantitative and qualitative methods to collect data. Researchers used the quantitative findings from Structural Equation Model (SEM) to explain and interpret the qualitative findings. The effect of leadership styles namely learning leadership, creative transformational leadership, and learning-centered leadership on innovation of school organization were examined using a quantitative survey questionnaire. A total of 760 school administrators and teachers were involved in the first phase. This is followed by in-depth interviews at the second phase to five experts in order to develop leadership style factors that have high factor loading based on the findings from first phase. The final phase was carried out with five academic experts and five practitioners to develop an approach and provide solutions for innovative issues. Quantitative data was analyzed using SEM while qualitative data was analyzed using content analysis and MACR (Multi Attribute Consensus Reaching) method. The quantitative findings show that all the three leadership styles were affecting the innovation of school organization. Learning leadership was found to have the highest effect ($\beta = 0.877$) and contributed 87.7 percent to the structural relationship model. This is followed by the creative transformational leadership ($\beta = 0.381$). The least capacity leadership style was learning centered leadership ($\beta = 0.264$). Moreover, it was found that the measurement model of leadership style factors has goodness fit with evident data, with $\chi^2 = 162.269$, $df = 136$, $p = .067$, $\chi^2/df = 1.193$, CFI = .997, TLI = .995, RMSEA = .028, and SRMR = 0.013. Finally, qualitative findings of this research have successfully proposed an approach for school administrators to develop organizational innovation.

Keywords: *Creative transformational leadership; innovative organization; learning centered leadership; learning leadership*

Introduction

Educational leadership is an essential factor to ensure the development of the country so that it can keep it up with the changing world. Current education situation has to transform rapidly from time to time due to the impact from academic and technological progress to Thailand's education and educational leadership (Ariatana, Sirisooksilp, & Tang, 2016). Howell and Costley (2001) stated that a leadership style not only covers leadership behavior directly but also concerning about leader's trait as leader is the one who produce successful work for the group outcomes and work performance. On the other hand, school organizations need to be more creative and innovative in order to compete, grow, and lead. Therefore, ChanLin, Hong, Horng, Chang, and Chu (2006) emphasized that school organizations have to help students to perform in the realm of innovative behavior which requires changes in both educational policy and teaching practices that are controlled by school administrators.

Leadership is considered as a key factor to promote innovative and positive change to the school organization. A school organization will be lost of direction to change and could experience negative change instead without an essential leadership (Moo & Yazdanifard, 2015). According to Ganta and Manukonda (2014), leadership is a kind of power possessed by leader who has the ability to influence or change the values, beliefs, behavior, and attitudes of other individuals. Moo and Yazdanifard emphasized that school administrator who has his full power to control the direction of the school, as well as through the influence they exert on their teachers that will motivate them to bring the school to greater success.

Somprach, Tang, and Popoonsak (2017) highlighted that school administrators have to adopt different leadership styles in order to match the astonishing diversity of school organizations, ranging from small, rural primary schools to extra-large secondary schools, across different contexts in Thailand. Current school administrators should utilize the application of information and communication technologies to provide innovative teaching and learning process in the rapid changes of school organization (Somprach, Prasertcharoensuk, & Tang, 2016). Somprach et al. (2016) found that school administrators should apply the standards of the Malcolm Baldrige National Award or the Thailand Quality Award as a framework to promote effective leadership.

In addition, Thai Ministry of Education (2011) summarized the three key features of education reform with regards to the second decade of this century (2009 to 2028), namely improvement in quality and standard of education and learning of Thai people, increment of life-long educational opportunities thoroughly and effectively, and encouragement sector participation and systematic reformation and learning in Thailand. This is further supported by Thai Ministry of Education (2015) by fostering the transformation of the education system with a tactic used based upon enriching moral and ethical values, in conjunction with a central program for cultivating excellence in education. Both government calls seemed to be in line with Somprach et al.'s findings (2017). They found that school administrators should obtain knowledge, competency, ethics, morality, creativity, systematic thinking, and good professional code of ethics so that they can exhibit effective leadership styles to achieve goals, improve quality standards, and use techniques that can lead to problem solving and accomplishment.

Literature Reviews

Somprach et al. (2017) explored the role of essential leadership styles of school principals in encouraging teachers' participation in professional learning communities in basic education schools in northeastern of Thailand. They found that learning, transformational, collaborative, and invitational leadership styles of the school principals contributed 55.6 percent of the variance in teachers' participation in professional learning communities based on 731 respondents' perceptions. Specifically, the impacts of learning leadership was 46.6 percent, that of transformational leadership was 6.7 percent, that of collaborative leadership was 1.6 percent, while that of invitational leadership was just 0.7 percent. In conclusion, the two essential leadership styles were learning leadership and transformational leadership in terms of promoting teachers' participation in their professional learning communities.

The National College for School Leadership (NCSL) (2004) defined learning-centered leadership as a set of strategies which influence the quality of teaching and learning in the classroom. School administrators should play their essential roles to lead learning, raise standards, and focus on students' achievement (NCSL, 2004). Leithwood and Riehl (2003: 2-7) stated that learning centered leadership has significant effects on student learning, the quality of curriculum, and teachers' instruction. Therefore, successful school administrators not only need to respond productively to challenges and opportunities that created by the accountability-oriented policy context but also respond productively to the opportunities and challenges of educating diverse groups of students.

Prasertcharoensuk and Tang (2016) investigated the effect of creative transformational leadership and teachers' teaching behavior in teaching efficiency of schools under the Office of Khon Kaen Educational Service Area 5, Thailand. Their findings showed that the relationship between creative transformational leadership as well as teachers' teaching behavior and teaching efficiency were positive and significant level at 0.01. In addition, their findings also indicated that there were two dimensions of creative transformational leadership, namely intellectual and contingency reward could be used to explain 81.76 percent of teaching efficiency at the macro level according to 150 school administrators. Finally, the multilevel analysis findings of Null Model, Simple Model, and Hypothetical Model revealed that the average value of teaching efficiency of 4.388, 4.394, 4.402 and the variance of parameter as 0.01656, 0.01420, 0.00302 respectively.

Hsiao and Chang (2011) investigated the effect of creative transformational leadership on organizational innovation thus examined whether organizational learning would be the mediator or not using SEM to test the relationship model. Hsiao and Chang have successfully provided the evidence that creative transformational leadership and organizational learning had significant and positive effects on organizational innovation from 330 teachers who are in charge of administration in postsecondary schools in Taiwan. Their findings also demonstrated that there was significant effect on the role of organizational learning as mediator on the relationship between transformational leadership and organizational innovation. Hsiao and Chang suggested that school administrators in Taiwan should use the strategies of creative transformational leadership and organizational learning simultaneously because organizational learning was found to be highly effective in term of achieving organizational innovation in the post-secondary schools in Taiwan.

RESEARCH OBJECTIVES

Based on the previous literatures above, researchers would like to study linear structural relationship model of the three essential leadership styles consisted of learning leadership, learning centered leadership, and creative transformational leadership toward innovation of school organization at the secondary basic education in Thailand. The following are the specific objectives of this study:

- i. To examine the relationships between the key factors of school leadership styles and innovation of school organization in a structural relationship model.
- ii. To examine the congruence of the structural model with empirical data.

- iii. To investigate the strategies for developing an innovative school organization.

Conceptual Framework

The independent variables are identified as learning leadership, learning-centered leadership, and creative transformational leadership and the dependent variable is innovative organization as elucidated in Figure 1. The learning leadership factors consist of creativity and courage, powerful environment, self-directed learning, team learning, transformation process and tailor making, technology, and integration according to Somprach and Tang's (2016) findings. The learning-centered leadership has been determined by Somprach (2016) as an essential leadership. The learning-centered leadership is comprised of vision for learning, high standard of achievement, rigorous curriculum, quality instruction, a connected community, and accountability. The final independent variable is creative transformational leadership identified from Brewer and Tierney's (2010) findings. This creative transformational leadership variable consists of four factors, namely systematic thinking, technological competency, innovative culture, and change management. All the three leadership styles are hypothesized to be essential leadership styles to shape the organizational culture and innovative environment.

School administrators are accountable to assemble and lead their teachers to optimal performance outcomes. An effective school administrator recognizes the importance of embracing differences among the teachers and knows how to connect the differences amongst them to get the best outcomes from the teachers. This is so called as in cultivating a school environment of continuous improvements, innovation, and initiative. Subsequently, school administrators must foster a commitment from the team to embrace an innovation mindset where each teacher learns to apply the differences that exist in one another for their own success and that of the school organization (Llopis, 2014). The dependent variable of this study is innovative organization that including knowledge management, atmosphere and information communication technology management, value and innovative culture, and personal strategic management. The relationships between the three essential leadership and innovative organization are justified as how school administrators create new school environments that are suitable for learning and innovation, are flexible and responsive to change, and apply information technology to their work.

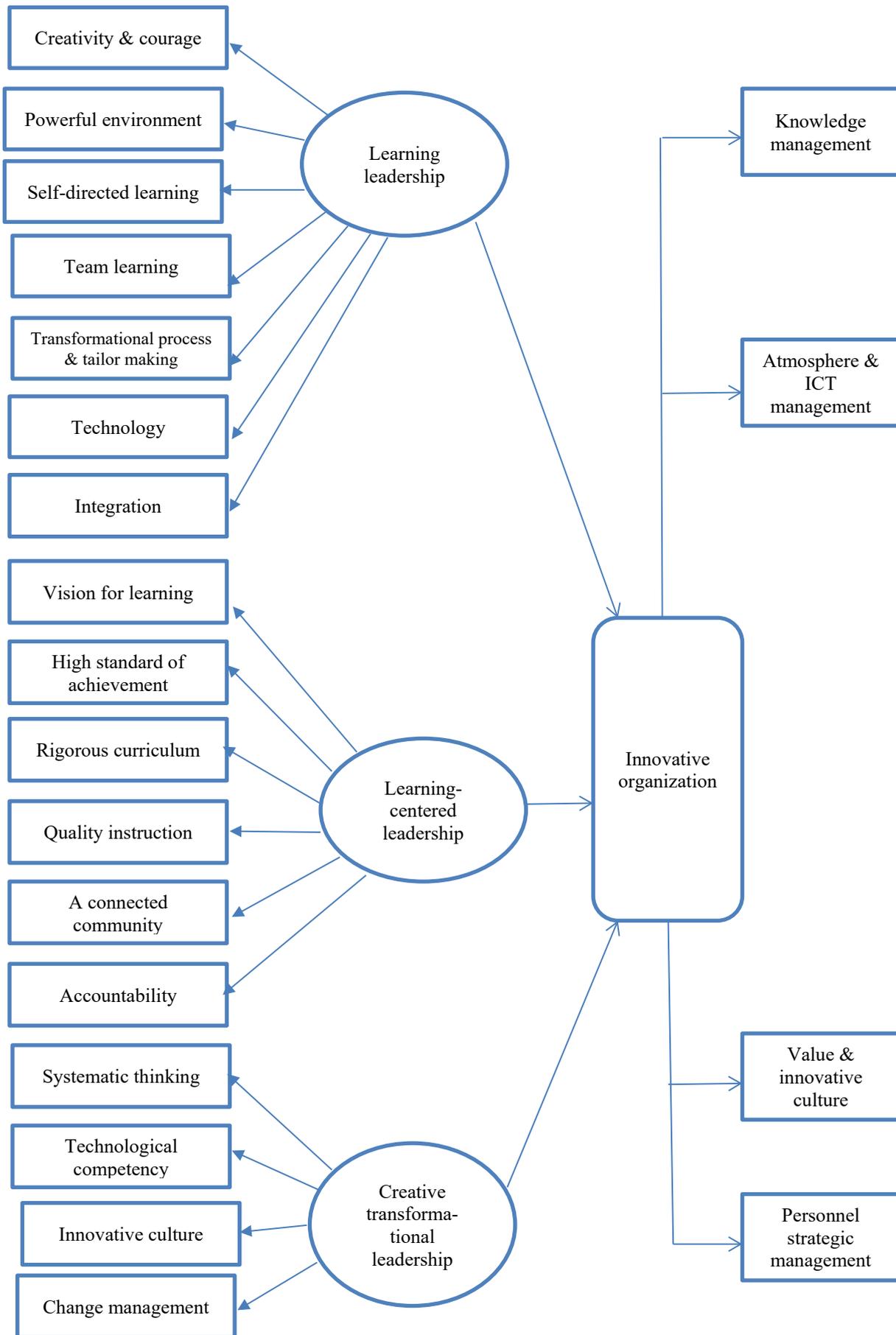


Figure 1. Conceptual Framework

Methodology

Researchers employed a mixed mode design to collect the quantitative and qualitative data using multiple ways to explore the research problem. It is referred as a combination of different modes of collecting data for a single research. Researchers begin to collect quantitative data followed by a collection of qualitative data to achieve the sequential explanatory of the collected data. Researchers intend to use the quantitative data analysis from Structural Equation Modeling (SEM) to assist in explaining and interpreting the findings of a qualitative study (Creswell, 2014).

At the first phase, a survey quantitative method was employed to 760 school administrators and teachers from 360 secondary schools utilizing a multi-stage random sampling technique. Sample size was determined based on Meyers, Gamst, and Guarino's (2006) rules of thumb because Meyers et al. proposed that suitable sample sizes depend upon the numbers of items available for factor analysis. The unit of analysis of this study was school using questionnaire as an instrument.

Quantitative data was analyzed using SEM in order to fit the model with empirical data. SEM is suitable to use because the theoretical constructs of this study are represented by the latent factor. The relationships between the theoretical constructs are represented by regression or path coefficients between the factors. The SEM implies a structure for the covariance between the observed variables. Confirmatory Factor Analysis (CFA) is used to validate the measurement model. Secondly, SEM directs around fitting the structural model by measuring the significance of the relationship between latent variables, which is accomplished through path analysis (Kaplan, 2000). CFA was used as a desirable validation stage preliminary to the main use of SEM to identify the causal relations among latent variables (Schumacker & Lomax, 2004)

At the second phase and final phase, researchers investigated to determine a suitable approach and guidelines for developing innovation of school organization. In-depth interviews with the five academic experts who were selected using purposive sampling were the method of qualitative data collection regarding development of leadership style factors based on findings from the first phase. The qualitative interview data was analyzed using content analysis. At the final phase, researcher employed MACR (Multi Attribute Consensus Reaching) method in order to find consensus concerning the approach with five academic and five practitioners. This MACR method required the five experts and five practitioners to give opinions, debate and find the solution for the attributes or issues in the meeting. The factor loading data gathered from the first phase adding with the information provided by the 10 informants from the final phase were used to outline an approach for innovation development which was coupled with the existing principles and concepts as well.

Findings

The findings of this study are presented in accordance with the research objectives stated above.

Quantitative findings of key factors of school leadership styles and innovation of school organization in a structural relationship model

According to the linear structural relationship of innovative organization model, there were seven key factors from learning leadership namely creativity and courage, powerful environment, self-directed learning, team learning, transformation process and tailor making, technology, and integration. On the other hand, there were six key factors from learning-centered leadership including vision for learning, high standard of achievement, rigorous curriculum, quality instruction, a connected community, and accountability. Finally, finding of the key factors from creative transformational leadership were systematic thinking, technological competency, innovative culture, and change management. CFA was used to validate at the preliminary stage to identify the causal relationships among the latent variables.

Findings related to factor loading values of all the key factors for innovation of school organization ranged from 0.679 to 0.816 are statistically significant at 0.05. Factor loading is the importance of standard factors of each observable variable in the relationship model of essential leadership factors and innovative organization that had been taken into account. The co-variance with innovative organization was from 67.90 to 86.00 percent.

An overview of learning leadership as indicated in Table 1 below shows that each factor had its loading value ranging from 0.683 to 0.774. The factor with the highest factor loading was technology ($\beta = 0.774$, $R^2 = 0.802$). This second highest factor was integration ($\beta = 0.768$, $R^2 = 0.781$). This is followed by transformational process and tailor making, self-directed learning, powerful environment, and team learning respectively. The factor that had the lowest factor loading was creativity and courage. As a result all the key factors of learning leadership are found to be important construct for innovation of school organization.

Table 1. Factor loading and validity of learning leadership in the measurement model

Factors	Matrix of Factor loading			
	β	SE	t	R ²
Creativity & courage	0.683	0.038	17.95	0.794
Powerful environment	0.705	0.041	17.098	0.747
Self-directed learning	0.706	0.040	17.565	0.773
Team learning	0.694	0.039	17.617	0.775
Transformational process & tailor making	0.759	0.040	18.804	0.837
Technology	0.774	0.043	18.135	0.802
Integration	0.768	0.043	17.728	0.781

Table 2 shows the overview of learning-centered leadership and its factor loading value ranging from 0.757 to 0.816. The key factor with the highest factor loading value was accountability ($\beta = 0.816$, $R^2 = 0.836$). The second highest factor loading value was quality instruction ($\beta = 0.766$, $R^2 = 0.831$). This is followed by high standard of achievement, vision for learning, and rigorous curriculum respectively. The factor that had the lowest factor loading was a connected community. As a result all the key factors of learning centered leadership are found to be important construct for innovation of school organization.

Table 2. Factor loading and validity of learning centered leadership in the measurement model

Factors	Matrix of Factor loading			
	β	SE	t	R ²
Vision for learning	0.762	0.044	17.517	0.770
High standard of achievement	0.764	0.041	18.743	0.835
Rigorous curriculum	0.759	0.041	18.679	0.831
Quality instruction	0.766	0.041	18.670	0.831
A connected community	0.757	0.044	17.180	0.752
Accountability	0.816	0.043	18.756	0.836

An overview of creative transformational leadership shows that each factor had value ranging from 0.568 to 0.698 (refer to Table 3). The key factor with the highest factor loading value was innovative culture ($\beta = 0.698$, $R^2 = 0.860$). The second highest factor loading value was change management ($\beta = 0.685$, $R^2 = 0.766$). The lowest factor loading value was systematic thinking ($\beta = 0.568$, $R^2 = 0.679$)

Table 3. Factor loading and validity of creative transformational leadership in the measurement model

Factors	Matrix of Factor loading			
	β	SE	t	R ²
Systematic thinking	0.568	0.036	15.742	0.679
Technology competency	0.679	0.039	17.283	0.763
Innovative culture	0.698	0.038	18.172	0.860
Change management	0.685	0.040	17.333	0.766

Table 4 shows the factor loading values of dependent variable that is innovation of school organization. The factor loading values were ranged from 0.731 to 0.766. The key factor with the highest factor loading value was knowledge management ($\beta = 0.766$, $R^2 = 0.891$). The second highest was atmosphere and ICT management ($\beta = 0.753$, $R^2 = 0.917$). The third highest was value and innovative culture ($\beta = 0.749$, $R^2 = 0.874$). Finally, the lowest factor loading value was personal strategic management ($\beta = 0.731$, $R^2 = 0.838$)

Table 4. Factor loading and validity of school organizational innovation in the measurement model

Factors	Matrix of Factor loading			
	β	SE	t	R ²
Knowledge management	0.766	0.039	19.876	0.891
Atmosphere & ICT management	0.753	0.037	20.370	0.917
Value & innovative culture	0.749	0.038	19.482	0.874
Personnel strategic management	0.731	0.039	18.773	0.838

Findings of CFA showed that all the three leadership styles were confirmed factors that affecting the innovation of school organization. Learning leadership had the highest factor loading value ($\beta = 0.877$). This is followed by

creative transformational leadership ($\beta = 0.381$). The least capacity of the effect on innovation of school organization was learning-centered leadership ($\beta = 0.264$). It can be concluded that all the three leadership styles were affecting the innovations of secondary basic school organizations in Thailand with 87.7 percent, 38.1 percent, and 26.4 percent in respect to learning, creative transformational, and learning centered leadership styles as shown in Table 5.

Table 5. Results of CFA of school leadership styles on innovations of school organization in the measurement model

Leadership factors	β	S.E.	t
Learning leadership	0.877	0.336	2.608
Learning centered leadership	0.264	0.104	2.532
Creative transformational leadership	0.381	0.143	2.651

Quantitative findings of congruence of the structural model with empirical data

Findings from the correlations between the factors of leadership styles could be assessed in the standard component score (β) which indicated significantly high and positive correlations at 0.05. Besides, it was found that the measurement model has a goodness fit with evident data, with $\chi^2 = 162.269$, $df = 136$, $p = .067$, $\chi^2/df = 1.193$, CFI = .997, TLI = .995, RMSEA = .028, and SRMR = 0.013. Finding shows that the structural relationship model of innovation of school organization were consistent with empirical data.

Qualitative findings of an approach for developing an innovative school organization

Qualitative findings are derived from the 10 experts' responses. The 10 experts shared with researchers regarding the challenges that the school administrators faced in terms of innovations. This is followed by debating the unique ways to respond to these innovative challenges in order to successfully overcome them. Once, they found the solutions for the innovative issues and proved that school administrators in basic secondary schools can create some types of creative approach to be innovative, researchers could accumulate them and consider as an approach. The followings are the qualitative findings:

- i. School administrators should focus on the three key factors of learning leadership, namely technology, integration, and transformational process and tailor making. Learning leadership has been justified from quantitative findings that it is the most powerful force for developing an innovative school organization. In addition, these initial quantitative findings were further having goodness of fit with empirical data in the structural relationship model. As a result, school administrators need to be competent, knowledgeable, creative to develop innovation and extending innovative potential of teachers.
- ii. School administrators should create a self- and team-learning culture in their school organization. In order to create this kind of culture, school administrators should open and be trusted. An environment of trust reduces defensiveness when innovative issues are raised. Teachers react honestly, ask questions more frequently, and are more spontaneous with their innovative ideas. School organization derives greater value from school administrators' talent, and teachers get to develop their competence and contribute to innovative success.
- iii. Conflicts and unfulfilled commitments are expected to occur whenever there are innovative issues. School administrators have to manage the differences among the teachers by looking into the alternatives and options without a predetermined outcome. Teachers are encouraged to express real opinions and resolve the innovative issues more effectively.
- iv. School administrators should know very well about their teachers' strengths. Hence, school administrators are able to match their talent and task effectively because they understand teachers' strengths and how best to elicit them. They and their teachers focus less on closing gaps and more on learning and building on strengths.
- v. School administrators should focus on development of communication and technology with the aim of making it accessible anywhere and anytime, as required by students and teachers. School administrators should know how to make the innovative implementation with clarity, precision defining what needs to be accomplished and how as a razor-sharp focus and simplicity. The commitment should come from all levels of the organization to remove the complexity from the way of implementing innovative issues.

Discussion

The main objective of this study was to examine the effect of school leadership styles, namely learning leadership, creative transformational leadership, and learning centered leadership toward basic secondary school organizational innovation. The findings reveal that when secondary school administrators used strategies such as learning leadership had a highest effect for the achievement of school organizational innovation. This is followed

by creative transformational leadership and learning centered leadership. This implies that school administrators play the major role in organizational innovation. School administrators have important responsibilities and should lead their teachers in making innovative changes at schools.

Qualitative findings reveal that school administrators should work together with their teachers and discuss the importance of innovative in the school system with their teachers. This finding is in accordance with Prasertcharoensuk and Tang (2016) as well as Somprach et al. (2017). Previously, Hsiao and Chang (2011) proposed a causal model of creative transformational leadership as an important effect on organizational innovation. According to Kursunoglu and Tanriogen (2009), school organizations need to transform in order to survive and be effective in current increasingly rapid innovation environment. For example, previous researchers such as Hsiao and Chang (2011), Somech (2010), and Zhang (2009) highlighted the importance of organizational innovation-specific meaning in schools and its relationship with actual innovational behavior. The findings of this study are in full support of the findings of these previous studies.

Researchers would like to suggest to Thailand Ministry of Education to conduct training which incorporating the three leadership styles, namely learning leadership, creative transformational leadership, and learning centered leadership to encourage organizational innovation. Our findings suggest that human resource department at the Ministry of Education needs to recruit school administrators who have potential for constructive learning, creative transformational, and learning-centered leadership as a means to facilitate innovative issues of school organization. Other practical consideration may involve the facilitation of an increasing understanding and appreciation of research evidence to help basic secondary school administrators specifically and teachers generally on how to incorporate organizational innovation, signal the importance of this type of behavior, and promote maximum innovative performance (Sanchez & Levine, 2009).

References

- Ariratana, W., Sirisooksilp, S., & Tang, K. N. (2016). The effect of leadership styles on professional learning community. *New Trends and Issues Proceedings on Humanities and Social Sciences*, 8, 60-69.
- Brewer, D. & Tierney, D. J. (2010). Barriers to innovation in U.S. higher education. *Reinventing the American University: The promise of innovation in higher education*. Washington, DC: American Enterprise Institute Conference, pp 1-35.
- ChanLin, L., Hong, J., Horng, J., Chang, S., & Chu, H. (2006). Factors influencing technology integration in teaching- a Taiwanese perspective. *Innovations in Education and Teaching International*, 43(1), 57-68.
- Creswell, J. W. (2003). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). Thousand Oaks, CA: Sage.
- Ganta, V. C. & Manukonda, J. K. (2014). Leadership during change and uncertainty in organizations. *International Journal of Organizational Behavior & Management Perspectives*, 3(3), 1183.
- Howell, J. P. & Costley, D. L. (2001). *Understanding behavior for effective leadership*. New Jersey, NJ: Prentice-Hall.
- Hsiao, H. C. & Chang, J. C. (2011). The role of organizational learning in transformational leadership and organizational innovation. *Asia Pacific Education Review*, 12, 621-631. doi: 10.1007/s12564-011-9165-x
- Kaplan, D. (2000). *Structural equation modeling: Foundations and extensions*. Thousand Oaks, CA: Sage Publications.
- Kursunoglu, A., & Tanriogen, A. (2009). The relationship between teachers' perceptions towards instructional leadership behaviors of their principals and teachers' attitudes towards change. *Procedia Social and Behavioral Sciences*, 1(1), 252-258.
- Leithwood, K. & Riehl, C. (2003). *What we know about successful school leadership: A report by Division A of AERA*. Nottingham, UK: NCSL.
- Llopis, G. (2014). 5 ways leaders enable innovation in their teams. Retrieved from <https://www.forbes.com/sites/glennllopis/#227f2b9050d0>
- Ministry of Education. (2011). *Educational reform in second decade* (5th ed.). Bangkok, Thailand: Pigwarn Graphic.
- Ministry of Education. (2015). *Educational standard for quality assurance*. Bangkok, Thailand: Kuruspa Landpao.
- Moo, J. H. & Yazdanifard, R. (2015). How effective leadership can facilitate change in organization through improvement and innovation. *Global Journal of Management and Business Research: Administration and Management*, 15(9), Version 1, 1-5.
- National College for School Leadership NCSL (2004). *Learning centered leadership (Pack 1)*. Nottingham, UK: NCSL.
- Prasertcharoensuk, T. & Tang, K. N. (2016). The effect of transformational leadership and teachers; teaching behavior on teaching efficiency. *The Turkish Online Journal of Educational Technology – December*

2016. *Special Issue for INTE 2016*, 826-833.

- Sanchez, J. I., & Levine, E. D. (2009). What is (or should be) the difference between competency modeling and traditional job analysis? *Human Resource Management Review*, 19, 53–63
- Schumacker, R. Lomax, R. (2004). *A Beginner's Guide to Structural Equation Modeling*, (2nd ed.). Mahwah, NJ: Lawrence Erlbaum.
- Somech, A. (2010). Participative decision making in schools: A mediating-moderating analytical framework for understanding school and teacher outcomes. *Educational Administration Quarterly*, 46(2), 174–209.
- Somprach, K. (2016). *Leadership and learning leadership for school principals*. Khon Kaen, Thailand: Klang Nanavitaya.
- Somprach, K. & Tang, K. N. (2016). Learning leadership of Thai school principals: A grounded theory study. *The Turkish Online Journal of Educational Technology – December 2016. Special Issue for INTE 2016*, 15-22.
- Somprach, K., Tang, K. N., & Popoonsak, P. (2017). The relationship between school leadership and professional learning communities in Thai basic education schools. *Educational Research Policy and Practice*, 16, 157-175. doi: 10.1007/s10671-016-9206-7.
- Somprach, K., Prasertcharoensuk, T., & Tang, K. N. (2016). Factors affecting the effectiveness of Thau secondary world class standard school. *International Journal of Learning and Teaching*, 08(1), 20-29.
- Zhang, J.-W. (2009). Technology-supported learning innovation in cultural contexts. *Education Technology Research & Development*, 58, 229–243.

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The Effect of Flipped Vocabulary Learning on Achievement and Attitudes of EFL Ninth-Graders in Oman

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Abstract

The study aimed to investigate the effects of flipped vocabulary learning (FVL) on vocabulary students' achievement and explore the students' attitudes towards flipped learning after experimenting such approach. Total of fifty students participated in the study; twenty-five students involved in the flipped learning approach (FLA) as the experimental group and twenty-five students were taught in the non-flipped learning environment as a control group. During the intervention, students in the experimental group were exposed to practice materials such as video clips (fill in vocabulary logs), PDF file and chatting via Whatsapp Application before face-to-face activities in the classroom; while during the classroom, the students did exercises on the practice materials in pairs/groups. To measure students' performance, a vocabulary pre-test and post-test were administered, and an independent t-test for post-test were used to compare the control group and the experimental group's performance. Moreover, to assess the experimental group's attitude toward their learning experience through FLA, an attitude survey questionnaire was distributed. The findings indicated that the experimental group outperformed the control group in vocabulary learning and they had a positive attitude toward the FLA.

Keywords: *Flipped learning, Vocabulary Achievement, Students' Attitudes.*

Introduction

Vocabulary knowledge is one of the most crucial components of any language proficiency (Harley, Cummins, Swain, & Allen, 1990). Without a wide range of meaningful vocabulary, it is a challenging task to communicate with people and initiate conversations with them (Gardner, 2013; Thornbury, 2006). Gardner (2013) and Thornbury (2006) stated that developing a wide range of vocabulary can assist learners in mastering foreign or second language. Additionally, most foreign language learners have a common understanding about the importance of learning English vocabulary. In their studies conducted in Korea, Fujiwara (2011) and Horwitz (1999) concluded that learning vocabulary appeared to be the most significant part of learning a foreign language in the learning process category. In Oman, students' lack of vocabulary is one of the main reasons for not being able to communicate well using the English language (Al-Maawaliya, 2008; Al-Siyabi, 2016; Al Hosni, 2014). Moreover, Omani students find difficulties in answering higher level questions in the extensive reading programs because of lack of basic vocabulary (Al-Maawaliya, 2008).

In response to the importance of mastering vocabulary, researchers have suggested different strategies and techniques to promote foreign language vocabulary learning such as repetition, mnemonics and using paper-dictionary (Nation, 1982; Rossiter, Abbott, & Kushnir, 2016). These researchers have claimed that these strategies are effective in learning foreign vocabulary but they have somehow considered them old-fashioned, however. Most Recently, with the emergence of technology, researchers in language teaching field have experimented different types of technological tools to promote vocabulary achievement such as augmented reality (Santos et al., 2016; Solak & Cakir, 2015), mobile applications (Ghazali & Ali, 2017; Lu, 2008; Zhang, Song, & Burston, 2011) and computer-based space (Chukharev-Hudilainen & Klepikova, 2016). These tools have been maintained to be effective in learning foreign language vocabulary (Chukharev-Hudilainen & Klepikova, 2016; Mahdi, 2018; Santos et al., 2016).

One of the evolving approaches that has emerged in the educational field with technology use and it has been widely used in the last decade is the flipped learning approach (FLA). The FLA was first initiated in 2007 by science teachers, Sam and Bergmann, who requested their students to watch video clips at home and then to discuss the content of the lesson in the class where the focus was on high-level skills in Blooms' taxonomy. Thus, The FLA can be defined as "a pedagogical approach in which direct instruction moves from the group learning space to the individual learning space, and the resulting group space is transformed into a dynamic, interactive learning environment where the educator guides students as they apply concepts and engage creatively in the subject matter" (Flipped Learning Network, 2014). Further, FLN specifies four essential pillars which constitute the four letters of the word "FLIP". These pillars are "flexible environment", "learning culture", "intentional content" and "professional educators" which stand for the four letters of the word "FLIP" respectively.

Statement Of The Problem

Flipped learning approach (FLA) is widespread and is used in different kinds of disciplines whether in higher education level or K-12 education (Lo & Hew, 2017; O'Flaherty & Phillips, 2015). Many researchers have maintained that FLA can be utilized in teaching a foreign language and it can promote learning achievement in different skills of the foreign language (Hung, 2014; Lee & Wallace, 2018; Lyddon, 2015). In addition, some studies revealed that FLA had changed the attitudes of learners towards learning English as a foreign language positively (El-Esery & Radwan, 2017; Lee & Wallace, 2018). However, some researchers have called for further studies to investigate the effect of flipped learning approach in different skills and sub-skills of the language (Kim, Park, Jang, & Nam, 2017; Moranski & Kim, 2016) and some researchers have called for further research in K-12 Education globally (Huang & Hong, 2016; Lo & Hew, 2017) and in Oman specifically (Lane-Kelso, 2015). More recently, Wang, An, and Wright (2018) recommended that vocabulary knowledge should be measured in details when investigating the effect of FLA on the foreign language skills.

Although an extensive research has been carried out on FLA, there seems to be few studies that have examined the effect of flipped vocabulary learning on learning achievement and the attitudes towards it in the Omani context. For example, this approach had been investigated in the science discipline in one of the Omani Government Schools (Al-Hosni, 2015), but not in teaching English..

Further, by providing evidence/s on the effect of flipped vocabulary learning on the achievement and attitudes, teachers can be aware of the benefits of flipped learning and they might consider applying this approach with their students while teaching vocabulary. Therefore, this study comes to explore more about the FLA in the context of teaching new vocabulary in Oman Basic Education schools and to explore students' attitudes towards the approach.

Research Proposes

The purposes of the study are:

1. To investigate the effect of flipped vocabulary learning approach on the vocabulary achievement in the Omani schools.
2. To explore the students' attitude towards flipped vocabulary learning after the implementation of the approach.

Research Questions And Hypotheses

- What are the effects of flipped vocabulary learning on vocabulary achievement?
- What is the attitude of grade nine students towards learning vocabulary using FLA?
- There is a significant difference between the flipped vocabulary learning group and non-flipped vocabulary learning group in the post-test vocabulary achievement test in favor of the flipped learning group at $p \leq .05$.

Research Design

The study employed quasi-experimental design in which the researcher developed a pre-test and a post-test to assess the vocabulary knowledge for the control group and experimental group. The control group was taught vocabulary explicitly at the beginning of each class and they practised some exercises pertinent to the explained vocabulary. Whereas, the experimental group learned the same words through flipped vocabulary learning approach. A questionnaire was administered to the flipped group to investigate the students' attitudes towards learning vocabulary through FLA. At the same time, students were asked about their preferences for and the benefits of flipped vocabulary learning as open-ended questions. The steps of the procedures are summarized in the following points:

- * Before the experiment, the researcher did a training presentation for the experimental group to show the proper way of watching video clips outside the classroom and before they come to the classroom as suggested by Sam and Berg and other researchers (Bergmann & Sams, 2012).
- * Then, each student in the flipped learning group was given a student vocabulary log where they can write some notes while they are watching the video clips. This vocabulary log was adopted form (Hadley & Charles, 2017) and adapted in Kang's (2015) study which is about flipped classroom.
- * Before each lesson, a video clip was sent to the students through Whatsapp application containing vocabulary items that they would study in the lesson the coming day. The new words range from seven to twelve words per video and the video clip lasted from four to seven minutes.
- * The students were asked to fill in the student vocabulary log and to answer questions related to the words embedded in the video while the students were watching the video clips.
- * In the classroom, the students did some activities pertinent to the words that they had watched outside the classroom. The activities focused on higher-order thinking skills in Bloom's Taxonomy and students answered open-ended questions and quizzes in pairs or in groups.
- * The students involved in Pair-and -Share activities through which students discussed the words in pairs and then they shared their ideas with the whole class (DeLozier & Rhodes, 2016).

- * The teacher also organized students presentations at the beginning of the lesson as a lead-in activity so that five students presented what they had watched in the videos clips outside the classroom (DeLozier & Rhodes, 2016).
- * For the control group, the teacher explained the same vocabulary items to the students in the classroom at the beginning of each lesson.

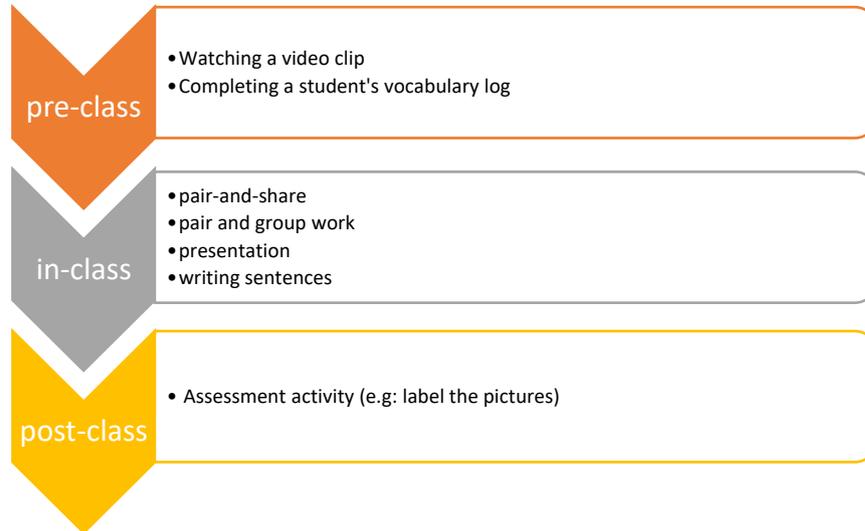


Figure 1. Illustration of stages of flipped vocabulary learning approach

Population And Sample

The population of the study was all grade nine students in Al Batina North Governorate in 2017/2018. The sample size was two male groups from different schools in Saham studying in two classrooms. The experimental group was from Alarqam Bin Alarqam School consisting of 25 students and they studied the vocabulary items using FLA. The experimental group was selected at the convenience of the researcher, and it was taught by him as FLA is new to English teachers in the Governorate. Prior to commencing the intervention, the students' parents signed in a consent form for approval as the students are under 18 years old (A sample of the consent form in Appendix B). The control group, randomly selected, comprised 25 learners studying in a nearby school. This group received explicit vocabulary instruction at the beginning of each lesson. A pre-test was administered to both groups to specify the homogeneity of these two groups.

Research Instrumnets

Vocabulary Achievement Pre-Test

The vocabulary pre-test was administered for the experimental group and the control group three days prior to teaching unit three. The researcher performed an independent t-test to ascertain that both groups are homogeneous and have the same breadth of vocabulary knowledge regarding the words they would study. Table 2 displays the results of the independent t-test.

Table 2 *Vocabulary Pre-test Independent T-test for Groups Equivalence*

Group	N	Mean	SD	t-value	p-value
Experimental	25	3.76	1.45	-.094	.926*
Control	25	3.72	1.57		

Total score is 10. *p < .05.

The results in table 2 indicates that there is no significant difference between the experimental group and the control group in the mean scores regarding the vocabulary knowledge.

Vocabulary Achievement Post-Test

The vocabulary post-test contained four different types of questions and each question measures specific vocabulary skill. For example, question one is multiple-choice and it measures guessing from context knowledge (Sasao & Webb, 2018). The second question was designed using defining context format and it measures the student's form recall ability (Kremmel & Schmitt, 2016). Laufer and Nation (1999) stated that this type of questions can assess the active vocabulary knowledge for the students. The third question is also a multiple-choice questions where the word definition is provided and the students have to choose the correct answer. Kremmel and Schmitt (2016) classified this kind of question as a form recognition test where the students can link the meaning with its suitable form. The fourth and last question is also guessing from context test (Sasao & Webb, 2018) in which students read a dialogue and they have to fill in the gaps according to the context provided. Both groups learned the vocabulary items through the intervention process while they are learning vocabulary using flipped leaning for the experimental group or the traditional way for the control group.

Students' Attitudes Post-Questionnaire

To determine the reliability of the questionnaire, it was piloted by 10 students in grade ten (not the experimental group) studying in the same school. These students experienced learning English via video clips last year but they watched the videos in the classroom. The analysis of the piloted questionnaire revealed that the Cronbach's alpha is .918, showing a high level of reliability as presented in Table 3.

Table 3 Cronbach's Alpha for Studnets' Attitudes Post-Questionnaire

Cronbach's Alpha	N of Items
.918	15

Results And Discussion

First Research Question: Vocabulary Achievement

What is the effect of flipped vocabulary learning on vocabulary achievement?

Table 4 Descriptive Statistics of the Vocabulary Post-test for the Experimental and Control Group

Group	N	Mean	SD	Std. Error Mean
Experimental	25	9.0	4.4	.88
Control	25	6.56	3.9	.78

Table 4 illustrates that the experimental group (M = 9.0, SD = 4.4) obtained higher marks in the vocabulary post-test than the control group (M = 6.65, SD = 3.9).

In order to respond to the first question, an independent-sample *t-test* was calculated to find any significant difference between the experimental group and the control group. The results are illustrated in Table 6.

Table 5 Results of Independent-Sample T-test for the Vocabulary Achievement Post-test

Group	N	Df	Mean	t-value	p-value
Experimental	25	48	9.0	2.057	.045*
Control	25		6.56		

Total score is 20. *p < .05.

Table 5 shows that the statistical difference between the two groups is significant at p-value= .05 in the mean scores of the vocabulary achievement post-test; the experimental group (M= 9.0) outperformed the control group (M= 6.56) in the vocabulary achievements, suggesting that the FLA had a positive effect on students' performance in the vocabulary knowledge. Therefore, the null hypothesis is rejected, and the alternative hypothesis is accepted. There is a significant difference between the two means in favour of the experimental group.

These findings of the study are in line with previous findings in Alnuhayt, (2018), Kang, (2015), Mori's et al. (2016) and Zhang et al., (2016) who reported higher achievements in the vocabulary achievement due to implementing flipped

vocabulary leaning, but contradict with Oh's (2017) study which showed insignificant statistical difference in the scores between the control group and the experimental group.

Second Research Question: Students' Attitudes

What is the attitude of grade nine students toward learning vocabulary using flipped learning approach?

Table 6 below shows the results of the questionnaire's responses.

Table 6 Means and Standard Deviations of the Experimental Group's Attitudes toward FLA

Statements	Mean	SD
10- I see that watching the video clips before the lesson is a useful way to learn new words.	4.36	.95
1- I enjoyed learning English vocabulary using the video clips at home before the lesson.	4.32	1.03
8- I enjoyed watching video clips via Whatsapp application.	4.28	.89
2- I felt comfortable when I learned vocabulary through the video clips that I watched outside the classroom and before the lesson.	4.24	.83
9- I felt more prepared to participate in in-class activities after I watched the video clips outside the classroom and before the lesson.	4.24	.92
5- I enjoyed the activities that I did in the classroom with my group.	4.2	1.2
14- I learned the meanings of some English vocabulary items during the discussion with my classmates in my group.	4.12	1.01
15- I felt bored while I was doing in-class activities that were related to English vocabulary items.*	4.12	1.23
7- I did not like learning new vocabulary items through watching video clips.*	4.08	1.18
6- Watching video clips at home helped me learn new vocabulary more promptly and efficiently.	4.04	1.06
4- Watching the video clips helped me learn vocabulary items through repeating them several times.	4.0	1.15
13- Watching video clips as homework increased my study load.*	3.72	1.24
12- Watching English vocabulary items in the video clips made them easy to remember.	3.68	1.25
11- Learning new vocabulary items is difficult via video clips.*	3.08	1.35
3- I learned new words more from face-to-face instruction than from the video clips at home.*	2.4	1.41
Overall total	3.93	1.11

*Negative statements that are reverse-coded

The table reveals important facts about students' attitudes toward FLA. First, the overall score displays that students have positive attitudes toward FLA in general (M = 3.93, SD = 1.11). Item#10 "I see that watching the video clips before the lesson is a useful way to learn new words" obtained the highest scores (M = 4.36, SD = .95). The second highest item in the scale is item#1 "I enjoyed learning English vocabulary using the video clips at home before the lesson" which has a mean of 4.32 and SD of 1.03. On the other side of the scale, item#3 "I learned new words more from face-to-face instruction than from the video clips at home" has the lowest mean (M = 2.4, SD = 1.14) and students were confused which technique is better whether to learn words with their teacher's instruction or learning words using the video clips. This claim can be supported by some of the students' answers to the first open-ended question as one of the students reported that "I enjoyed watching video clips at home, but I understand more when the teacher explains the words in the classroom". Item#3 is followed by item#11 "Learning new vocabulary items is difficult via video clips" which is the second lowest item in the scale (M = 3.08, SD = 1.35). Although item#11 has the second lowest

item, it is still in the range of positive attitude toward learning vocabulary through video clips and the SD of this item indicates the responses' dispersion is widespread as it is the highest score among the items.

It is safe to say that overall the students' attitudes toward learning vocabulary is positive, and it is in line with the results from (Adnan, 2017; Ahmed, 2016; Al-Harbi & Alshumaimeri, 2016; Kang, 2015; Lee & Wallace, 2018; Wang et al., 2018; Wanner & Palmer, 2015; Wong & Chu, 2014). However, it contrasts with DeSantis, Van Curen, Putsch, and Metzger (2015) findings.

Conclusion

This quasi-experimental study set out to examine the effect of flipped vocabulary learning approach on vocabulary achievement and attitudes of Omani grade nine students. This chapter shows a summary of the main findings regarding the two research questions, implications for using flipped vocabulary learning generally and specifically in Oman and recommendations for further research.

Based on the results obtained from the statistical analysis of the vocabulary achievement post-test, there was statistical difference between the experimental group and the control group in favor of the experimental group. A possible explanation for this result is that flipped learning is suitable for elementary level (Mori et al., 2016) and millennial students enjoy employing this approach while learning vocabulary (Roehl, Reddy, & Shannon, 2013).

This study has found that generally students in the experimental group have positive attitude toward FLA. Students enjoyed the new approach more than anything else in the process of learning vocabulary.

References

- Adnan, M. (2017). Perceptions of senior-year ELT students for flipped classroom: a materials development course. *Computer Assisted Language Learning*, 30(3-4), 204-222.
- Ahmed, M. (2016). The effect of a flipping classroom on writing skill in English as a foreign language and students' attitude towards flipping. *US-China Foreign Language*, 14(2), 98-114.
- Al-Harbi, S. S., & Alshumaimeri, Y. A. (2016). The Flipped Classroom Impact in Grammar Class on EFL Saudi Secondary School Students' Performances and Attitudes. *English Language Teaching*, 9(10), 60-80.
- Al-Hosni, H. A. S. (2015). The Effect of Using Flipped Classroom Approach in Acquiring General Self-Efficacy and Academic Achievement of Ninth-Grade Female Students. (Unpublished Master's Thesis), Sultan Qaboos University, Muscat, Oman.
- Al-Maawaliya, F. M. (2008). The Effectiveness of Web-based Extensive Reading in Developing Vocabulary and Reading Skills. (Unpublished Master's Thesis), Sultan Qaboos University, Muscat, Oman.
- Al-Siyabi, S. S. H. (2016). The Effect of WebQuest on Vocabulary Achievement and Attitudes of Omani EFL Students (Unpublished Master's Thesis), Sultan Qaboos University, Muscat, Oman.
- Al Hosni, S. (2014). Speaking difficulties encountered by young EFL learners. *International Journal on Studies in English Language and Literature (IJSELL)*, 2(6), 22-30.
- Bergmann, J., & Sams, A. (2012). *Flip Your Classroom: Reach Every Student in Every Class Every Day*: International Society for Technology in Education.
- Chukharev-Hudilainen, E., & Klepikova, T. A. (2016). The Effectiveness of Computer-Based Spaced Repetition in Foreign Language Vocabulary Instruction: A Double-Blind Study. *CALICO Journal*, 33(3), 334-354.
- DeLozier, S. J., & Rhodes, M. G. (2016). Flipped Classrooms: a Review of Key Ideas and Recommendations for Practice. *Educational Psychology Review*, 29(1), 141-151. doi:10.1007/s10648-015-9356-9
- DeSantis, J., Van Curen, R., Putsch, J., & Metzger, J. (2015). Do students learn more from a flip? An exploration of the efficacy of flipped and traditional lessons. *Journal of Interactive Learning Research*, 26(1), 39-63.
- El-Esery, D. A. M., & Radwan, D. N. A. (2017). Modeling CALL programs in EFL Flipped Classrooms to Enhance Achievement and Language Learning Attitude. *JRCIET*, 3(2), 115-125.
- Flipped Learning Network. (2014). Definition of Flipped Learning. Retrieved from <https://flippedlearning.org/definition-of-flipped-learning/>
- Fujiwara, T. (2011). Language Learning Beliefs of Thai EFL University Students: Dimensional Structure and Cultural Variations. *Electronic Journal of Foreign Language Teaching*, 8(1), 87-107.
- Gardner, D. (2013). *Exploring Vocabulary: Language in Action*: Routledge.
- Ghazali, M. A. I. M., & Ali, Z. (2017). The Impact of Using VocBlast to Learn Technical Vocabulary at Tertiary Level. *International Journal of Novel Research in Education and Learning*, 4(3), 22-25.
- Hadley, G., & Charles, M. (2017). Enhancing Extensive Reading with Data-Driven Learning. *Language Learning & Technology*, 21(3), 131-152.
- Harley, B., Cummins, J., Swain, M., & Allen, P. (1990). The nature of language proficiency. In B. Harley, J. Cummins, M. Swain, & P. Allen (Eds.), *The Development of Second Language Proficiency* (pp. 7-25). Cambridge: Cambridge University Press.

- Horwitz, E. K. (1999). Cultural and situational influences on foreign language learners' beliefs about language learning: A review of BALLI studies. *System*, 27(4), 557-576.
- Huang, Y.-N., & Hong, Z.-R. (2016). The effects of a flipped English classroom intervention on students' information and communication technology and English reading comprehension. *Educational Technology Research and Development*, 64(2), 175-193.
- Hung, H.-T. (2014). Flipping the classroom for English language learners to foster active learning. *Computer Assisted Language Learning*, 28(1), 81-96. doi:10.1080/09588221.2014.967701
- Kang, N. (2015). The Comparison between Regular and Flipped Classrooms for EFL Korean Adult Learners. *Multimedia-Assisted Language Learning*, 18(3), 41-72.
- Kim, J. E., Park, H., Jang, M., & Nam, H. (2017). Exploring Flipped Classroom Effects on Second Language Learners' Cognitive Processing. *Foreign Language Annals*, 50(2), 260-284.
- Kremmel, B., & Schmitt, N. (2016). Interpreting Vocabulary Test Scores: What Do Various Item Formats Tell Us About Learners' Ability to Employ Words? *Language Assessment Quarterly*, 13(4), 377-392.
- Lane-Kelso, M. (2015). The Pedagogy of Flipped Instruction in Oman. *Turkish Online Journal of Educational Technology-TOJET*, 14(1), 143-150.
- Laufer, B., & Nation, P. (1999). A vocabulary-size test of controlled productive ability. *Language Testing*, 16(1), 33-51.
- Lee, G., & Wallace, A. (2018). Flipped learning in the English as a foreign language classroom: Outcomes and perceptions. *Tesol Quarterly*, 52(1), 62-84.
- Lo, C. K., & Hew, K. F. (2017). A critical review of flipped classroom challenges in K-12 education: possible solutions and recommendations for future research. *Research and Practice in Technology Enhanced Learning*, 12(1), 1-22.
- Lu, M. (2008). Effectiveness of vocabulary learning via mobile phone. *Journal of Computer Assisted Learning*, 24(6), 515-525.
- Lyddon, P. A. (2015). The flip side of flipped language teaching. Paper presented at the Critical CALL – Proceedings of the 2015 EUROCALL Conference, Padova, Italy.
- Mahdi, H. S. (2018). Effectiveness of mobile devices on vocabulary learning: A meta-analysis. *Journal of Educational Computing Research*, 56(1), 134-154.
- Moranski, K., & Kim, F. (2016). 'Flipping' Lessons in a Multi-Section Spanish Course: Implications for Assigning Explicit Grammar Instruction Outside of the Classroom. *The Modern Language Journal*, 100(4), 830-852.
- Mori, Y., Omori, M., & Sato, K. (2016). The impact of flipped online Kanji instruction on written vocabulary learning for introductory and intermediate Japanese language students. *Foreign Language Annals*, 49(4), 729-749.
- Nation, P. (1982). Beginning to learn foreign vocabulary: A review of the research. *RELC journal*, 13(1), 14-36.
- O'Flaherty, J., & Phillips, C. (2015). The use of flipped classrooms in higher education: A scoping review. *The Internet and Higher Education*, 25, 85-95. doi:10.1016/j.iheduc.2015.02.002
- Oh, E. (2017). The Effect of Peer Teaching via Flipped Vocabulary Learning on Class Engagement and Learning Achievements. *Multimedia-Assisted Language Learning*, 20(3), 105-127. doi:10.15702/mall.2017.20.3.105
- Roehl, A., Reddy, S. L., & Shannon, G. J. (2013). The flipped classroom: An opportunity to engage millennial students through active learning. *Journal of Family and Consumer Sciences*, 105(2), 44-49.
- Rossiter, M. J., Abbott, M. L., & Kushnir, A. (2016). L2 Vocabulary Research and Instructional Practices: Where Are the Gaps? *The Electronic Journal for English as a Second Language*, 20(1), 1-25.
- Santos, M. E. C., Lübke, A. i. W., Taketomi, T., Yamamoto, G., Rodrigo, M. M. T., Sandor, C., & Kato, H. (2016). Augmented reality as multimedia: the case for situated vocabulary learning. *Research and Practice in Technology Enhanced Learning*, 11(1), 1-23. doi:10.1186/s41039-016-0028-2
- Sasao, Y., & Webb, S. (2018). The guessing from context test. *ITL-International Journal of Applied Linguistics*, 169(1), 115-141.
- Solak, E., & Cakir, R. (2015). Exploring the Effect of Materials Designed with Augmented Reality on Language Learners' Vocabulary Learning. *Journal of Educators Online*, 12(2), 50-72.
- Thornbury, S. (2006). *How to teach vocabulary*: Pearson Education India.
- Wang, J., An, N., & Wright, C. (2018). Enhancing beginner learners' oral proficiency in a flipped Chinese foreign language classroom. *Computer Assisted Language Learning*, 1-32. doi:10.1080/09588221.2017.1417872
- Wanner, T., & Palmer, E. (2015). Personalising learning: Exploring student and teacher perceptions about flexible learning and assessment in a flipped university course. *Computers & Education*, 88(C), 354-369.
- Wong, K., & Chu, D. W. (2014). Is the Flipped Classroom Model Effective in the Perspectives of Students' Perceptions and Benefits? Paper presented at the International Conference on Hybrid Learning and Continuing Education.
- Zhang, H., Song, W., & Burston, J. (2011). Reexamining the Effectiveness of Vocabulary Learning via Mobile Phones. *Turkish Online Journal of Educational Technology-TOJET*, 10(3), 203-214.

Appendix A

The Effect Of Multiple Graphical Representations On Learning Algorithms

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Abstract

Computational thinking is included among the 10 top skills that will be needed for success in the near future. A well-trying method to develop this skill is teaching and learning programming, but this is a challenging task. Among reasons researchers highlight that programming assumes the understanding of computer algorithms that are inherently abstract entities. A suggested method to bridge this impediment is algorithm visualization. The AlgoRythmics tool generates such a teaching-learning environment that includes multiple algorithm visualization methods: dance choreography videos and computer animations. In the present study we proposed to analyze the strengths and weaknesses of this kind of multiple graphical representation. Experiment results emphasize that students (especially novices) failed to benefit from the multiple graphical representation (video + animation). Interestingly, if single representation was used, novice students achieved better results when they studied the algorithms by dance choreography videos compared to computer animations.

Keywords: *Computational thinking; teaching-learning programming; algorithm visualization; multiple graphical representations*

Introduction

Teaching-learning programming is a challenging task. Accordingly, first year programming courses have the highest dropout rates in comparison with other courses, despite the high popularity of Computer Science subjects (O'Brien & Humphreys, 2016). Among reasons researchers highlight that programming assumes the understanding of computer algorithms that are inherently abstract entities. In line with Knuth's famous quote, "an algorithm must be seen to be believed", teachers try to bridge this impediment by algorithm visualization (Knuth, 1968, Section 1.1, Page 4).

Technologies of algorithm visualization usually includes video or computer-based animations that graphically illustrate algorithms in terms of their high-level operations. If the learning process includes both video and animation students are faced with multiple graphical representation. Most of the previous studies (Schwonke, Berthold, & Renkl, 2009) in this field analyzed the pros and cons of this method using static representations. In the present study we proposed to analyze the strengths and weaknesses of environments that include both video and animation based illustrations of computer algorithms.

Students who participated in the experiment were invited to study sorting algorithms in the AlgoRythmics (<http://algo-rythmics.ms.sapientia.ro/>) environment. In line with previous studies novices failed to benefit from watching both the video and the animation of the algorithm. They performed better by viewing the animation twice. On the other hand, if the environment did not change, novice students achieved better results when they watched the dance choreography video twice than in the case of watching the computer animation repeatedly.

Computational Thinking, Algorithms And Algorithm Visualisation

According to Wing computational thinking (CT) is the fourth basic skill next to reading, writing and arithmetic. Wing suggested that CT is a "universally applicable attitude and skill set everyone, not just computer scientists, would be eager to learn and use" (Wing, 2006). In line with this, the Future Work Skills report of the Institute For The Future includes computational thinking among the 10 top skills that will be needed for success in 2020 (Davies, Fidler, & Gorbis, 2011).

We will use the term in accordance with its revised definition, i.e. as the thought process involved in formulating problems so that "their solutions can be represented as computational steps and algorithms" (Aho, 2012). In their attempt to define CT, the International Society for Technology in Education (ISTE, 2017) and the American Computer Science Teachers Association (CSTA, 2017) identified several related concepts: data collection, data analysis, data representation, problem decomposition, abstraction, algorithms, automation, parallelization and simulation. Correspondingly, promoting CT is a complex and challenging task. A well-trying method to develop this skill is teaching and learning programming. According to the authors of (Mannila et al., 2014) study, programming promotes CT if it includes all phases of the programming process: analysis, decomposition, design and implementation (coding). Végh and Stoffová (2017) concludes that one of the reasons why programming is so challenging for the first-year computer science students is that it assumes comprehending computer algorithms characterized by abstract data structures, and dynamic change of data. To bridge the gap between abstract concepts and real life objects

algorithm visualization comes to our help. The term algorithm visualization (AV) refers to the graphical illustration of a computer algorithm that represents the high-level operations of the algorithm, usually with the purpose of enhancing the understanding of its procedural behavior. AV technologies include video or computer based animations that illustrate how the algorithm works in action (Katai, 2014). Recent studies comparing instructional animation with static pictures confirmed that animations have a higher educational effectiveness especially when procedural behavior needs to be represented. Accordingly, several algorithm visualization tools have been developed to present the steps of an algorithm using graphical effects (Tekdal, 2013).

Multiple Algorithm Visualization

Multiple representations have the potential to improve learning because different representations: (1) highlight complementary aspects of the material to be studied and (2) produce different effects on mental processing. Prior research in this field is based mostly on a so-called symbol-systems approach, since it focuses on learning with text and one additional graphical representation. On the other hand, learning materials, especially in STEM domains, usually include, beside the textual descriptions, multiple graphical representations (Rau, 2013).

Different graphical representations might be beneficial because they emphasize complementary aspects that can provide a more accurate model of the domain. On the other hand, while an extensive model can have remarkable positive effect on the learning process it can also lead to a cognitive overload in the pictorial part of the memory (Clark, Mayer, & Thalheimer, 2003) and shift the attention from the domain concepts that are represented to the actual representation instead of its interpretation. Additionally, to benefit from multiple graphical representation students need to understand each individual representation and make connections between them. In line with previous studies, domain experts can rely on their previous knowledge to interpret the different representations, while novices might have insufficient domain knowledge to effectively transfer between them (Rau, 2013). Consequently, the author of the previously cited paper concludes that students benefit from multiple graphical representations based on their skills.

Our goal was to test this phenomenon regarding multiple *algorithm* visualization using dynamic illustrations (videos and animations). We emphasize this aspect, because other studies focused mostly on static illustrations.

The Algo-Rythmics Enviroment

The project was started in 2007 at Sapientia University with the production of 6 dance choreography videos illustrating the following sorting algorithms: bubble-sort, insert-sort, selection-sort, shell-sort, merge-sort, quick-sort. The platform was extended since then with a new sorting algorithm: the heap-sort. In addition to the sorting algorithms searching algorithms such as the linear-search, binary-search and backtracking algorithms were produced with the help of professional art institutes using flamenco and ballet dance styles. These videos aim to offer students a sensory experiment using a creative approach. The article that presents the project details the goals of the project: “We focused on how dance can be involved in informatics education (sorting algorithms). The method takes additional multi-sensory elements into the programming-education through arts (dance, music, rhythm, theatrical role-playing). Combining these art forms teachers could create a multi-sensory learning environment that involves almost all the senses: visual, auditory, kinesthetic and tactile.” (Katai, Toth, & Adorjani, 2014)



Figure 1. Searching (linear, binary, backtracking) and sorting (selection, bubble, insertion, shell, merge, quick, heap) algorithms

The environment introduces a web application as well (<http://algo-rhythmics.ms.sapientia.ro/>) that includes attached computer animations of the algorithms, and additionally invites users to actively participate in the learning process by reconstructing and orchestrating the studied algorithms.

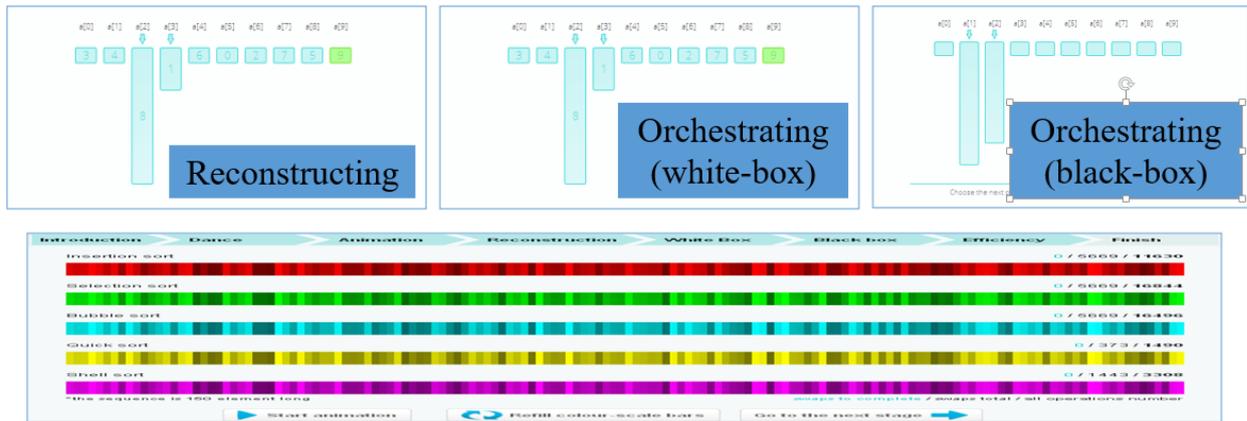


Figure 2. Studying algorithms in the Algo-Rhythmics environment

Method

The study we performed took place at Sapientia University during the educational year of 2017/18 when 181 students took our Programming-I course. The charts below depict the students’ previous studies, the programs they enrolled in and the number of year they have been studying programming in their high-school years.

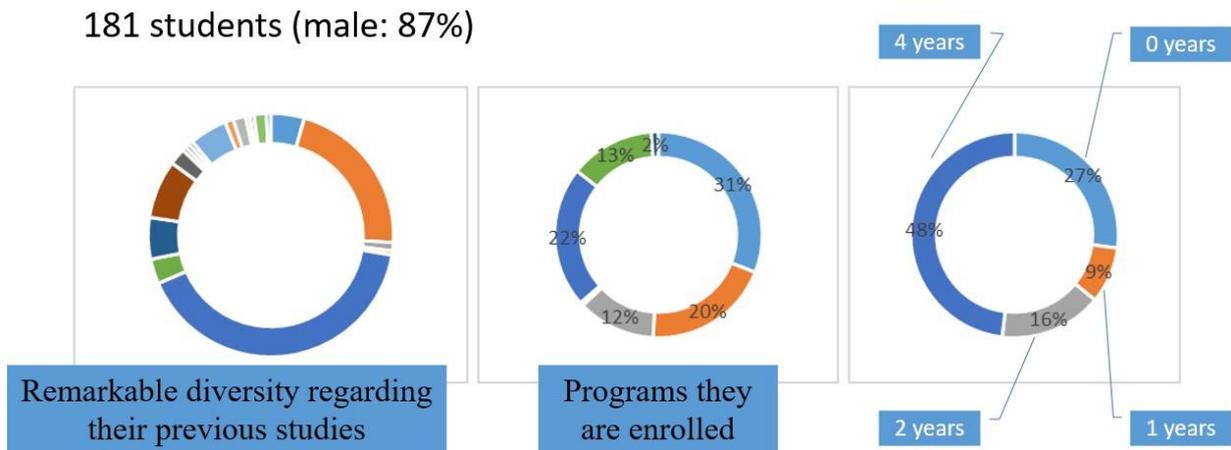


Figure 3. Programming-I course at Sapientia University: participants (2017/18)

The first diagram shows the remarkable diversity of the previous high school curriculum that includes subject such as human studies, biology, chemistry or mathematics and computer sciences. The second chart lists the enrollment programs including computer sciences and several engineering programs. In addition to the third chart we emphasize that students with 1 or 2 years of prior programming studies were initiated into searching and quadratic sorting algorithms, while students with 4 years of prior knowledge studied even the concept of algorithm complexity.

Before the experiment students received a minimal intro in programming and were familiarized with the environment on a minimal level by watching and superficially analyzing the video and animation of bubble- and selection-sort algorithms.

Participants and procedure

In the first experiment students enrolled into engineering programs were divided into two groups. The first group watched the computer based animation of the insertion sort algorithm twice. Out of the 46 students taking part on the experiment 23 had no prior programming knowledge, and the other 23 studied programming from 1 to 4 years. The second group was invited to watch the dance choreography once followed by the watching the animation once. Out of the 56 participants of this group 18 had no prior knowledge and 38 students studied programming from 1 to 4 years.

The task after watching the animation twice, respectively the video once and the animation once was to reconstruct the algorithm on a random input.

The second experiment carried out, grouped the students enrolled into engineering programs into two groups, so that the first one watched the animation four times (21 novice students and 25 students with prior knowledge in programming) and the second one the video two times (26 students with no prior knowledge and 20 students with 1 to 4 years of previous programming studies). The reason for playing the animation 4 times and the video only twice was that all students spend about the same time on watching the videos and animations (as the length of the video is about the double time compared to the length of the animation). The algorithm represented by the video and animation was the shell sort, which is a more complex algorithm compared to the insertion sort of the previous experiment.

The same task was assigned to students, reconstructing the algorithm on a random input.

Results And Discussion

The result of the first experiment showed that in both cases students performed similarly, there was no significant difference between watching the animation twice or the video combined with the animation. Students with no programming experience performed slightly better when watching the animation twice, while students with some prior knowledge performed better with the combined option (see Table 1 and Figure 4).

	Without prior knowledge	With prior knowledge	Entire group
Animation twice	69.13%	73.47%	71.3%
Video + Animation	60.83%	77.36%	72.05%

Table 1. Performance results of the first experiment

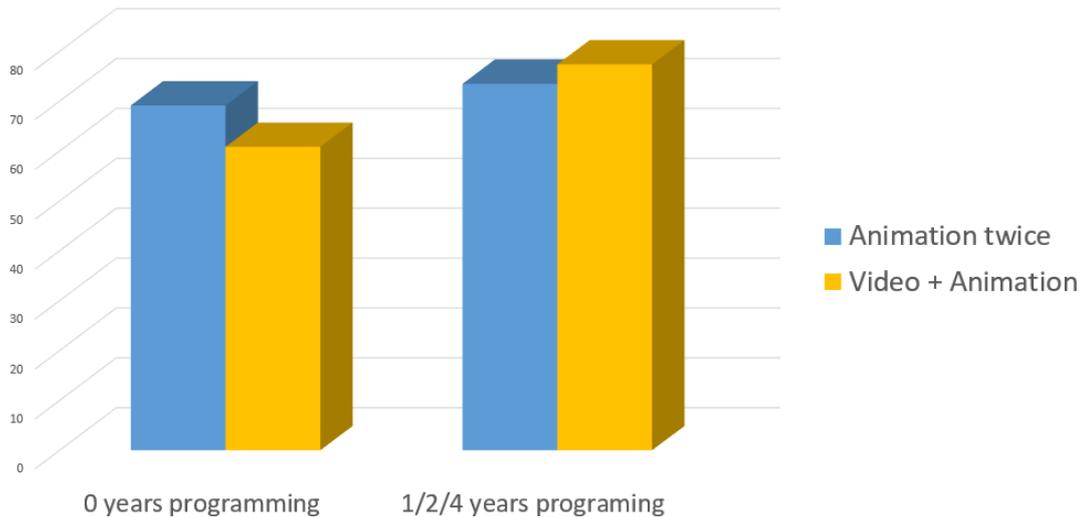


Figure 4. Results of the first experiment (insertion sort)

Surprisingly, but in line with previous studies both groups (with or without prior knowledge in programming) failed to benefit from the multiple representation of the algorithm.

The results of the second experiment are surprising as there is a significant difference in the case of novice students, they performed significantly better ($p=0.01$, 29.52% vs. 51.15%) when watching the video twice. In case of students with prior knowledge the difference was also substantial, but not statistically significant (see Table 2 and Figure 5).

	Without prior knowledge	With prior knowledge	Entire group
Animation four times	29.52%	57.6%	44.78%
Video two times	51.15%	70.75%	59.67%

Table 2. Performance results of the second experiment

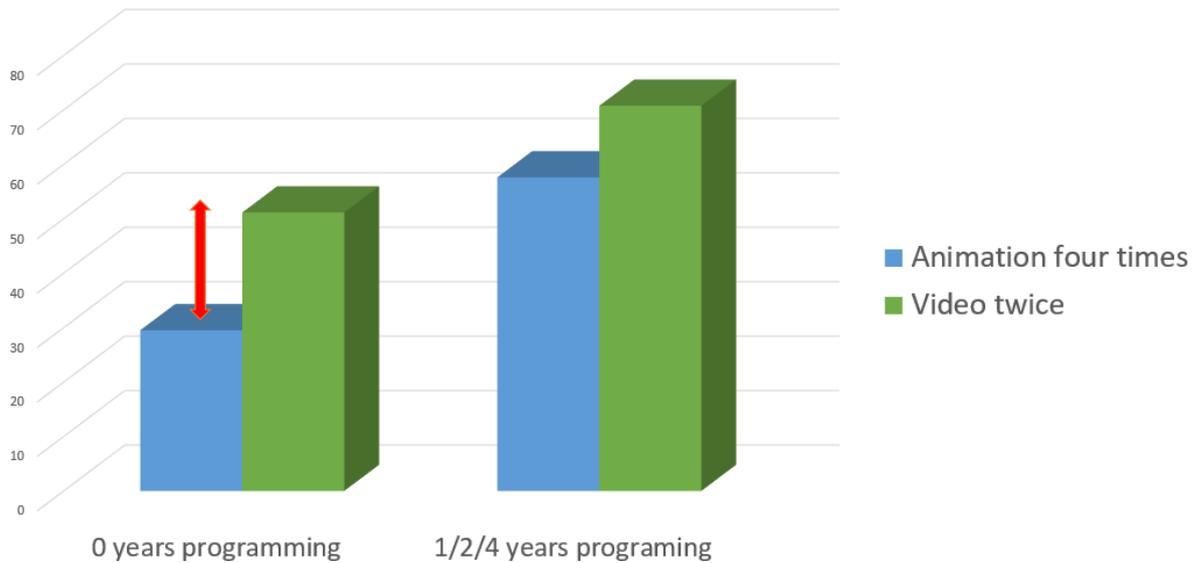


Figure 5. Results of second experiment (shell sort)

Taking into account both groups the difference (in favor of the video) is also significant with a p value of 0.03 (44.78% vs. 59.67%).

Conclusions

A possible reason why students failed to benefit from the multiple representation of the algorithm (video illustration plus computer animation) is that they were disturbed by the change of the environment. They were incapable to connect the two representations without being distracted from the logic of the algorithm. In line with previous studies novices were more affected.

On the other hand, interestingly, if the environment did not change, both groups achieved better results when they watched the dance choreography video twice then in the case of watching the computer animation repeatedly. These results, favoring our video illustration versus computer animation, before being generalized, obviously, have to be tested on other algorithms too.

References

- Aho, A. V. (2012). Computation and computational thinking. *The Computer Journal*, 55(7), 832-835.
- Clark, R. C., Mayer, R. E., & Thalheimer, W. (2003). E-learning and the science of instruction: Proven guidelines for consumers and designers of multimedia learning. *Performance Improvement*, 42(5), 41-43.
- Davies, A., Fidler, D., & Gorbis, M. (2011). Future work skills 2020. *Institute for the Future for University of Phoenix Research Institute*, 540.
- Katai, Z., Toth, L., & Adorjani, A. K. (2014). Multi-Sensory Informatics Education. *Informatics in Education*, 13(2), 225-240.
- Katai, Z. (2014, June). Selective hiding for improved algorithmic visualization. In *Proceedings of the 2014 conference on Innovation & technology in computer science education* (pp. 33-38). ACM.
- KNVTH, D. (1968). *The art of computer programming Vol.1*.
- Mannila, L., Dagiene, V., Demo, B., Grgurina, N., Mirolo, C., Rolandsson, L., & Settle, A. (2014, June). Computational thinking in K-9 education. In *Proceedings of the working group reports of the 2014 on innovation & technology in computer science education conference* (pp. 1-29). ACM.
- O'Brien, C., & Humphreys, N. I. M. J. (2016). Concern over drop-out rates in computer science courses [On-line]. Available: <http://www.irishtimes.com/news/education/concern-over-drop-out-rates-in-computer-science-courses-1.2491751>
- Rau, M. A. (2013). Conceptual learning with multiple graphical representations: Intelligent tutoring systems support for sense-making and fluency-building processes.
- Schwonke, R., Berthold, K., & Renkl, A. (2009). How multiple external representations are used and how they can be made more useful. *Applied Cognitive Psychology: The Official Journal of the Society for Applied Research in Memory and Cognition*, 23(9), 1227-1243.
- Tekdal, M. (2013). The Effect of an Example-Based Dynamic Program Visualization Environment on Students' Programming Skills. *Educational Technology & Society*, 16(3), 400-410.

- Végh, L., & Stoffová, V. (2017). Algorithm Animations for Teaching and Learning the Main Ideas of Basic Sortings. *Informatics in Education, 16*(1), 121-140.
- Wing, J. M. (2006). Computational thinking. *Communications of the ACM, 49*(3), 33-35.

The Effect of Work Practice to Vocational School Participants: Marketing Department Sample*

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Abstract

Vocational school participants often work through the lessons, and studying is measured as a main cause for slow progress in learning activities. Also, the nature of participants' work practice changes importantly. At vocational school level, work practice is prearranged ending donkey's years of a learner program. Then the whole lot initiated to transformation anthropological-intensive framework by the effect of up-to-the-minute life expectancy, every model exasperated to proposition the unsurpassed eminence. At the termination of the presented deal it is decisive to gauge whether designed penalty area is gained. Edifying foundations are the undeveloped pitch where these penalty areas ought to be updated in the school syllabuses.

In this study, we designed to scrutinizes how working even though reading is correlated to homework triumph and grabbed slants to scholarship and the fauna of the work practice. A total of 112 marketing department participants in Kocaeli vocational school completed a questionnaire at graduation position. The results exposed which deed alternative academic work was correlated to concentration to scholarship, and non-academic work was correlated to an unpretentious homework of passages. Additionally, we initiate which strategic reading has a central protagonist by via of bid. By meeting participants' unifying abilities and featuring their deep-level learning style, participants find it simple to make linking between work practice and lecture studies in their academic life.

Key words: vocational school, student, work practice, graduation, academic work

Introduction

Vocational school participants should must develop in their scholarships in the interior a restricted stretch. Educational examination on the connection flanked by working and homework is infrequent, even if working is usually realized as an central aspect paying to participants' social and economic life (Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. 2015; Moulin et al. 2013; Gueudet, G. 2008; Şeneldir at all, 2017a). These participants often absorb in hire even though scholarship at school. Examination revisions proved which the figure of working participants has bigger step by step in various realms completed the donkey's years, for example in Turkey, Japanese And Austria (Ryan et al. 2011; Lizzio at all. 2002). Patel and his team (2012) even claimed which the many of vocational participants possibly will fill added stretch at their work room than academy grounds. And, they support the proposition which the participants should spend more time at their workplaces than in university classes. Meant for core whys and wherefores of participants work in scholarship at university we can state two targets which lid the cost of living social and economic conditions and exploring work practice for future career (Görentaş And Yıldız, 1999; Bilgin at all, 2010; Yıldız And Görentaş; Bilgin And Görentaş, 2008). But it is also important to add the participants' work practice is generally non-academic, for example, working in the fabrics, closed areas and service sector (Nonis And Hudson 2006; Şeneldir at all, 2017b). And, the work is usually unrelated to their study areas and future working careers because of their firs selection criteria to have the working place is economical rather than educational (Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, s. 2015; Koparan at all, 2018; Of at all, 2017; Tola at all, 2017). Additionally, the in the air homework distinguished which dissolute- and deliberate-stylishness participants correspondingly the fauna of the work practices; for case, they were showed which unhurried vocational participants operated a lesser amount of in the formal part than nearer vocational participants.

Participants need to accomplish their scholarships in the interior a restricted time. Educational examination on the memory flanked by working and school life suspensions leisurely is infrequent. Working is usually realized as a central subject paying to reducing out (Hovdhaugen 2013). Some academical scholarships tentative the kindred flanked by working and school life have note which working added than 18 hours per week bigger the stopping of school life. Also, related in the direction of non-working participants, working quite a few eras did not growth the hazard (Dublin. Hourigan, M. & O'Donoghue, J. 2007; Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. 2015; Hovdhaugen 2013; Moulin et al. 2013). Similarly, Katsikas (2013) stressed which jam-packed-stretch work seem like to undesirably act this extent of the training, but which part-time study does not.

* A brief version of this article presented at INTE 2018

Methods

The homework was conducted at Kocaeli vocational school of Kocaeli university. The figures be situated placid in the helix of 2017 complete an automated feedback form. A total of 112 marketing branch participants participated the feedback form at their valediction position. The applicants be situated masculine 46 % (n = 52) and male %54 (n = 60). The weeks mixt from 21 to 35 years (m = 26, sd = 6.1): added than a third of the applicants were younger than 24 years.

The feedback form determined the participants’ work practice and slants to scholarship. The fauna of the work practice was at odds into three forms: particular academic work, added academic work and non-academic work (Tuononen, T., Mattsson, M., Parpala,A. & Lindblom-Ylanne, S. 2015;).

- *Own school work meant which was linked to the student’s correction or discipline.*
- *Other school work meant work which was educational but differed from the student’s own study area.*
- *The third type had no correlation to university studies.*

This arrangement is about with the participants’ calculations of their work practices. Participants be situated questioned in what manner various eras they made unalike brands of work on typical for every week in the subsequent year of instruction. The rule was 1 = none, 2 = less than 20 h and 3 = added than 20 h. For the participants may have had unalike brands of work practices, it was created a variable work practice in which 1 = no work practice, 2 = own academic work, 3 = non-academic work, 4 = both own hypothetical work and non-academic work practices (Tuononen, T., Mattsson, M., Parpala,A. & Lindblom-Ylanne, S. 2015;). Variables computing the fauna of work practice and homework triumph are offered (table 1).

Table 1. Variables measuring the nature of work practice and study success

<u>variable</u>	<u>indicator</u>
Nature of work practice	
own academic work	1 = none, 2 = < 20 h, 3 = ≥ 20 h
other academic work	1 = none, 2 = < 20 h, 3 = ≥ 20 h
non-academic work	1 = none, 2 = < 20 h, 3 = ≥ 20 h
work practice	
1	= no work practice
2	= own academic work practice
3	= non-academic work practice
4	= both own academic and non-academic work practices

Findings

The grades exposed which 86 % of the participants had operated in their past year of scholarships. 32 % had academic work practice and 20 % non-hypothetical work practice. Also, 37 % had both an own hypothetical and non-academic work practices. Only 15 % of participants had no work practice. More than half of the participants operated less than 20 h per week and 48 % of them more than 20 h. The number of participants’ work practices are offered in table 2.

Table 2. The nature and amount of participants’ work practices

	f	%
<u>Nature of work practice</u>		
No work practice	15	13.4
Own academic work practice	36	32.1
Non-academic work practice	22	19.6
Both own academic and non-academic work practices	39	36.9
A total of cases	112	100.0
<u>Amount of working (per week)</u>		
None	10	8.9
< 20 h	48	42.9
≥ 20 h	54	48.2
A total of cases	112	100.0

Nature and amount of work practice

Own academic work

None	47	42.0
< 20 h	43	38.4
≥ 20 h	22	19.6
A total of cases	112	100.0

Other academic work

None	85	64.3
< 20 h	14	22.7
≥20 h	13	13.0
A total of cases	112	100.0

Non-academic work

None	65	58.0
< 20 h	33	29.5
≥ 20 h	14	12.5
A total of cases	112	100.0

An uncommon mislaid ideals was studied during the analyse period. The number of mislaid ideals re the work practice variables was not low: added hypothetical work 18 %, non-academic work 12 % and academic work 8 %. When mislaid ideals crooked purchasable in the work variables with non-missing ideals in alternative work variable. The values were filled by zilch. For example, if a schoolchild had a mislaid charge in “non-academic work” and “other academic work” and a non-missing value in “own academic work”, the two missing ideals be situated changed by zilch (Tuononen, T., Mattsson, M., Parpala,A. & Lindblom-Ylanne, S. 2015; Entwistle & Peterson, 2004).

The correlations between the fauna of work and gender/age were scrutinized via perceptive essence rectangular information. The associates flanked by the volume and fauna of work and homework triumph were the first analyzed by Anovas. Then, the act magnitudes be situated premeditated via statistical data provided by spss 16. The individual questionnaire items were not included in the analyses because they were naturally known to correlate from head to foot neck and neck.

The source for the operational slice of all the copies is functioned by the measurement model. The self-determining variables were categorical. These variables were erected, by means of the grouping “no work” operational as a represent. The worsening amounts correlated to the variables conveyed lower are accordingly read as representing from the location charge. The power of the self-determining variables on the conclusion variables are explained as absolute to the location variables (Tuononen, T., Mattsson, M., Parpala,A. & Lindblom-Ylanne, S. 2015; Hayes And Preacher, 2014).

Three copies were composed as well as all self-determining variables in the unique typical. This was finished for as well as all self-determining variables in one model and book-keeping for their affairs would have set the concluding $3^3 = 27$ assemblages via 26 variables. The affairs were simple to existing and construe with three copies. The usual boobos of the typical restrictions were appraised via a favoritism-adjusted practice, which has been included to yield grades for subsidiary effects in the copies. Via bootstrap-created trials in the copies is ideal because the sampler spreading of hte effects cannot be rumored to be normal (Tuononen, T., Mattsson, M., Parpala,A. & Lindblom-Ylanne, S. 2015; Parpala And Lindblom-Yla`Nne 2012). The participants’ slants to scholarship were leisurely by a 12-item improved kind of slants to scholarship and reading register in which they were questioned to pronounce how they had been situated reading. A five-argument Likert rule (1 = totally disagree, 2 = disagree, 3 = no idea, 4 = agree, 5 = totally agree) was used. The aspects computing the slants to scholarship and illustrations of the objects were listed below (table 2).

Table 2 factors measuring the approaches to learning

Factor	example item	Number of items
<u>Approaches to learning</u>		
Deep approach	I've carefully looked at evidence to reach my own conclusion about what i am studying	4
Surface approach	Much of what i have learned seems nothing more than many unrelated bits and pieces in my mind	4
Organised studying	On the whole, i've been quite systematic and organised in my studying	4

We analysed the kin flanked by working eras and homework situation via a capricious instead of global volume of work in direction to reconnoiter the thinkable nonlinear effect in the figures the Anova results turned out a rapport flanked by volume of work and homework level ($f(3, 691) = 12.41, p = <0.005, g^2 = 0.02$). Participants who operated less than 20 hours established much work points each season ($m = 24.9, sd = 6.3$) than participants which operated over 20 h ($m = 23.6, sd = 7.29$). Participants with no work practice acknowledged added homework neck and neck ($m = 27.1, sd = 7.8$) than participants who operated more than 20 h ($m = 23.7, sd = 7.5$). The correlation between the type of the work practice and work level was then discovered ($f(3, 571) = 3.26, p = 0.008, g^2 = 0.01$). Participants that have more work practice as well as in cooperation particular at school or out of school work practices took a lot of mark ($m = 25.8, sd = 7.3$) than participants that has his/her special school work practice ($m = 24.8, sd = 7.3$) or no work practice ($m = 24.8, sd = 7.9$) (Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. 2015).

Than we explored the rapport flanked by work practice and unlike upbringing variables (Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. 2015). The meaning affairs flanked by undergraduate gender and volume of working were not initiate. But a rapport was confirmed flanked by the fauna of work practice and gender, $v^2(3, n = 874) = 9.83, p = 0.077$. Masculine participants had added various work practice as well as in cooperation academic work and non-academic work practices than to male participants. Also, we found a rapport flanked by the fauna of work practice and time of life which $v^2(5, n = 836) = 49.11, p < 0.001$. The grades exposed which the participants who are lower than 25 years old had a lesser amount of hypothetical work practice than grown-up participants. Additionally which the fledgling participants had more non-academic work practice than grown-up participants. However, these participants got more unlike work practice as two groups his/he own hypothetical work and non-hypothetical work practices more efficient than older participants (Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. 2015).

Result and discussion

Because of study time is not limited of vocational school participants, the completing of program show differences. Participants with unlike homework situations, as well as participants with same lengthy homework time had considered even elongated than 10 years. This generous of data give us to correspondingly pursuit participants who capacity has thrown down purchasable on or after the edifying classifications. The figures comprised of participants with unlike homework areas, as well as participants that very lengthy homework studies to be considered to elongated than 9 seasons (Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. 2015). The points of this homework illustration which pecuniary, societal and hire state of affairs possibly will not be situated equivalent in unlike realms, but then again it seems like which likenesses standing in work practice can funding participants' scholarship historical if working eras are quite not copious. In this homework we perceive which even if the instruction driver classification is unlike from the other realms, the grades are tranquil in contour with the former scholarships about this question.

The volume of work was correlated to homework bound. Participants who operated a lesser amount of than 20 h acknowledged added homework acclaims than individuals who operated more than 20 h for every week. In count, the homework initiate which non-working participants acknowledged added homework acclaims than participants who operated various eras, but then again which they did not diverge from participants who operated a lesser amount of than 20 h weekly. This mean which the homework proved the nonlinear kin flanked by working eras and homework triumph. Participants who had in cooperation academic pitch and non-hypothetical work practices

got added homework acclaims than the participants who unique nature of work practice or no work practice. Finally, non-academic work of a lesser amount of than 20 h daily was really correlated to homework bound.

References

- Biglin, T. And Görentaş, N. (2008). A Note On Characterization Of $N_n(D_n)$. *International Electronic Journal Of Algebra*, 3, 135-140.
- Biglin, T., Görentaş, N. And Kelebek, I.G. (2010). Characterization Of Torsion Units Of Z_{24} . *Journal Of Korean Mathematical Society*, 6, 1239-1252.
- Entwistle, N. J., & Peterson, E. R. (2004). Conceptions Of Learning And Knowledge In Higher Education: Relationships With Study Behavior And Influences Of Learning Environments. *International Journal Of Educational Research*. Doi:[10.1016/J.Ijer.2005.08.009](https://doi.org/10.1016/J.Ijer.2005.08.009).
- Görentaş, N. And Yıldız, M. (1999). A Characterization Of Idempotents And Idempotent Generators Of Q_8 . *Bulletin Of Pure And Applied Sciences*, 18(2), 289-292.
- Gueudet, G. (2008). Investigating the secondary-tertiary transition. *Educational Studies in Mathematics*, 67, 237-254.
- HEA and NCCA (2011). From transaction to transmission: Outcome of the conference on transition from second to third-level education in Ireland. Dublin.
- Hourigan, M. & O'Donoghue, J. (2007) Mathematical under-preparedness: the influence of the pre-tertiary mathematics experience on students' ability to make a successful transition to tertiary level mathematics courses in Ireland. *International Journal of Mathematical Education in Science and Technology*, 38 (4), 461-476.
- Hayes, A. F., & Preacher, K. J. (2014). Statistical Mediation Analysis With A Multicategory Independent Variable. *British Journal Of Mathematical And Statistical Psychology*, 67(3), 451-470. Doi:[10.1111/Bmsp.12028](https://doi.org/10.1111/Bmsp.12028).
- Hovdhaugen, E. (2013). Working While Studying: The Impact Of Term-Time Employment On Dropout Rates. *Journal Of Education And Work*. Doi:[10.1080/13639080.2013.869311](https://doi.org/10.1080/13639080.2013.869311).
- Katsikas, E. (2013). The Impact Of Participants' Working Status On Academic Progress: Assessing The Implications Of Policy Change In Greece. *Journal Of Education And Work*. Doi:[10.1080/13639080.2012.691606](https://doi.org/10.1080/13639080.2012.691606).
- Lizzio, A., Wilson, K., & Simons, R. (2002). University Participants' Perceptions Of The Learning Environment And Academic Outcomes: Implications For Theory And Practice. *Studies In Higher Education*. Doi:[10.1080/03075070120099359](https://doi.org/10.1080/03075070120099359).
- Moulin, S., Doray, P., Laplante, B., & Street, M. C. (2013). Work Intensity And Non-Completion Of University: Longitudinal Approach And Causal Inference. *Journal Of Education And Work*. Doi:[10.1080/13639080.2011.653554](https://doi.org/10.1080/13639080.2011.653554).
- Nonis, S., & Hudson, G. I. (2006). Academic Performance Of College Participants: Influence Of Time Spent Studying And Working. *Journal Of Education For Business*. Doi:[10.3200/Joeb.81.3.151-159](https://doi.org/10.3200/Joeb.81.3.151-159).
- Of M., Şeneldir O., Tola Y., Koparan B., Kahraman K. (2017). Scorm Nesneleri Ile Etkileşimli Eğitim. *Turkish Online Journal Of Educational Technology*, Si, 64-72
- Tuononen, T., Mattsson, M., Parpala, A. & Lindblom-Ylänne, S. (2015). Work Practice In Relation To Study Pace And Thesis Grade: Investigating The Mediating Role Of Student Learning. *Higher Education*. Doi:[10.1007/S10734-015-9937-Z](https://doi.org/10.1007/S10734-015-9937-Z).
- Patel, N., Brinkman, W.-P., & Coughlan, J. (2012). Work Placements And Academic Achievement: Undergraduate Computing Participants. *Education ? Training*. Doi:[10.1108/00400911211254299](https://doi.org/10.1108/00400911211254299).
- Parpala, A., & Lindblom-Ylänne, S. (2012). Using A Research Instrument For Developing Quality At The University. *Quality Of Higher Education*. Doi:[10.1080/13538322.2012.733493](https://doi.org/10.1080/13538322.2012.733493).
- Ryan, M., Barns, A., & McAuliffe, D. (2011). Part-Time Employment And Effects On Australian Social Work Participants: A Report On A National Study. *Australian Social Work*. Doi:[10.1080/0312407x.2010.538420](https://doi.org/10.1080/0312407x.2010.538420).
- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional And Social Intelligence Against Inertia. *Turkish Online Journal Of Educational Technology*, Si, Pp.229-234.
- Şeneldir, O., Kudu, M. Genel, Y., Akça, Ü., Soydaş, Aydın., S. (2017b). Types Of Behavior In Businesses And Resistance To Individual Change. *Turkish Online Journal Of Educational Technology*, Si, Pp.843-848.
- Tola Y., Aydın S., Şeneldir O., Mutlu C., Koparan B., Of M. (2017). Meslek Yüksekokulu Öğrencilerinin Memnuniyet Düzeyleri Üzerine Bir Araştırma. *Turkish Online Journal Of Educational Technology*, Si, 607-610.
- Yıldız, M. And Görentaş, M. (1996). On Homogenous Maps. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 1(2), 14-149.

The Effect On Teaching Effectiveness: A Multi-Level Analysis

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Abstract

The aim of this research was to examine the school and class factors that affecting teachers' teaching effectiveness by investigating the relative impacts of the variables as class and school factors at the micro and macro levels respectively. This study utilized quantitative survey design using two types of questionnaires. A total of 513 respondents comprised of 68 school administrators at the macro level and 445 teaching staff at the micro level in schools under the Office of Secondary Educational Service Area 25. The ratio between of samples was 20:1 meaning that 20 samples to each observable variable. The hierarchical linear model (HML) analysis was utilized to test the fixed effect and random effect of null model, simple model, and hypothesis model. Results of null model regarding the fixed effect analysis showed the mean score of teachers' teaching effectiveness was 3.237 ($\gamma_{00}=3.237$ at significant level (0.01) $t = 99.329$ (while the random effect analysis showed the statistical significance for the mean score of teachers' teaching effectiveness was 0.01) Wald $Z = 3.619$ (and the variance in parameter estimation was 0.038, while the intra-class correlation coefficient) ρ) was 0.285. Next, results of the simple model regarding fixed effect analysis showed that the mean score of teaching effectiveness was 3.208 ($\gamma_{00}=3.208$ at significant level (0.01) $t = 28.480$ (Analysis of random effects from simple model showed that school differences u_{0j} at significant level (0.01) Wald $Z = 3.106$ (and a variance in parameter estimation of 0.007. Finally, results of the hypothesis model relating to fixed effects showed a mean of teaching effectiveness of 3.213 ($\gamma_{00}=3.213$ at significant level (0.01) $t = 6.815$ (meanwhile analysis of random effects showed a decrease in values relative to the null model analysis. School differences u_{0j} showed at significant level (0.05) Wald $Z = 1.920$ (and a variance in parameter estimation of 0.005.

Keywords: *Classroom factors; school factors; teachers' teaching effectiveness*

Introduction

Teaching effectiveness is important because effective teaching assists student learning. According to Chianese (2015), an effective teacher can have an enriching effect on the daily lives of students and their lifelong education and career aspirations are also have a direct influence in enhancing student learning. Sirisooksilp, Ariratana, and Tang's (2015) study found that there are two types of leadership styles namely supportive leadership and participative leadership of school administrators have significantly affecting teachers' teaching effectiveness. They also found that these two leadership styles have jointly predicted teachers' teaching effectiveness for 56.80 percent at the significance level as 0.01. This implies that school administrators should promote, practice, and improve these two leadership styles to increase teachers' working effectiveness.

Somprach, Prasertcharoensuk, and Tang (2016) studied on the factors that affecting the effectiveness of World Class Standard Schools in Thailand. Their findings showed that strategic planning factor were identified as most effective factor but teacher professional development factor had the least capacity. Consequently, their results revealed that there were four significant predictors namely information and communication technology, teacher professional development, internal process management, and the focus on students and stakeholder were factors that have successfully contributed 65.60 percent variance of effectiveness of Thai World Class Standards Schools.

Prasertcharoensuk and Tang (2017) investigated the effect of strategic leadership factors of administrators on school effectiveness under the Office of MahaSarakham Primary Educational Service Area 3, Thailand. Findings from 510 samples indicated that all the comparison result either strategic leadership of administrators or school effectiveness was significantly difference to school size respectively. In addition, the structural equation model of strategic leadership factors which affecting school effectiveness was fitted but there was no significant effect of administrators' strategic leadership factors toward school effectiveness at 0.05 level.

Conceptual Framework And Research Hypothesis

The main aim of this study was to examine the effect of school-level factors and classroom-level factors on teaching effectiveness in schools under the administration of the Office of Secondary Educational Service Area 25, Thailand. Therefore, this study was conceptualized that school-level factors and classroom-level factors influence the teachers' teaching effectiveness at macro and micro levels. Specifically, researchers evaluated the relative impact of factors that exists at classroom and school levels of analysis on teachers' teaching effectiveness.

The variables in this study include classroom-level factors, school-level factors, and teaching effectiveness. Classroom-level factors are (i) bio-social characteristics of teachers; (ii) social support for teachers; (iii) teaching performance, and (iv) teaching atmosphere. On the other hand, school-level factors encompass (i) school size; (ii) academic leadership; (iii) school culture, and (iv) school atmosphere. Teaching effectiveness is concerned with particular teacher dealing with students in a particular environment as teacher attempts to achieve a particular instructional goal by presenting the ideas and activities involved in a teaching unit that most facilitates the regular and systematic development of the students (Thawinkarn, Tang, & Ariratana, 2018). In regard to Thawinkarn et al.'s (2018) definition, teaching effectiveness which acts as a dependent variable refers to (i) academic achievement; (ii) satisfaction of teacher's teaching performance, and (iii) participation of parents and community. The proposed conceptual framework is shown in Figure 1 below:

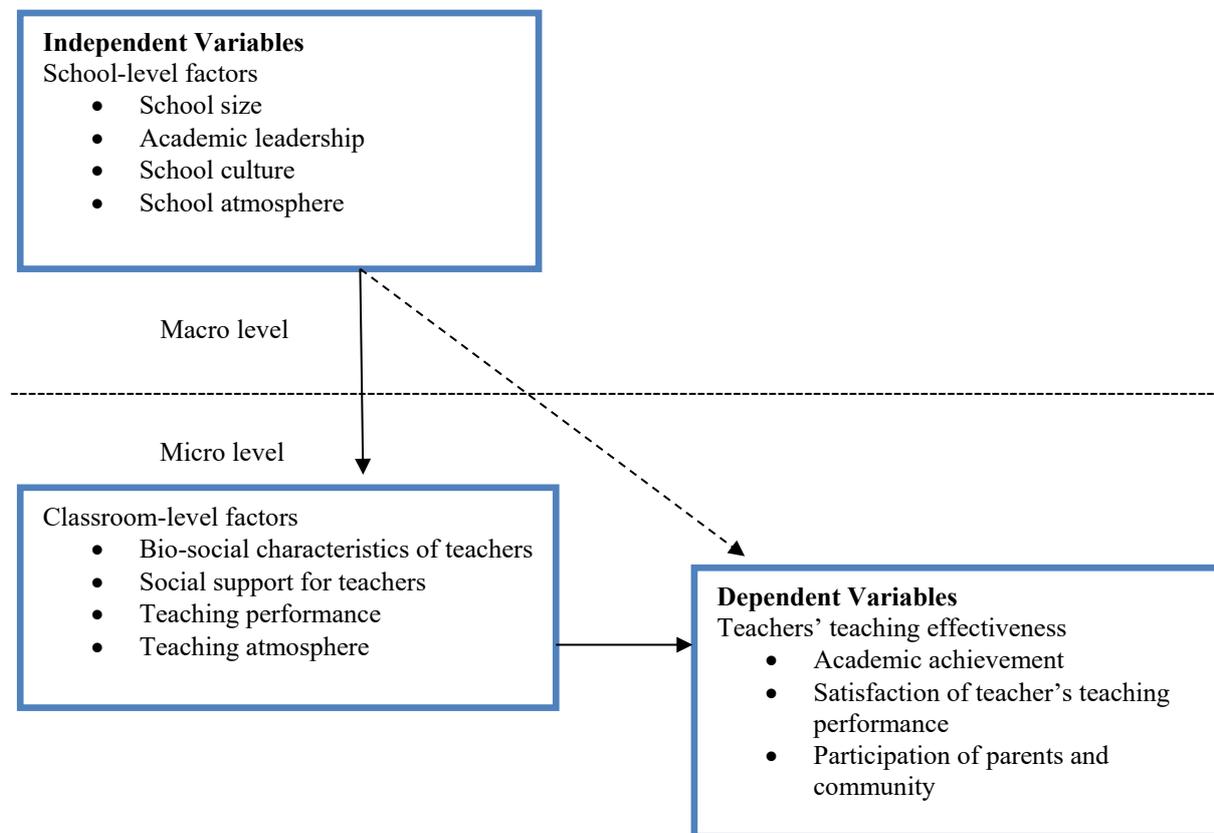


Figure 1: Conceptual Framework

The first model to test is a null model which was conducted on the dependent variables without taking into account any independent variables. The null hypothesis 1 was tested on the extent that the fixed effect and random effect on teachers' teaching effectiveness as follow:

Ho₁: There is no fixed and random effects of null model

When the micro level variables could be used to explain the teachers' teaching effectiveness, researchers would be able to perform to test the effects on the simple model. To what extent that the fixed and random effects on teachers' teaching effectiveness, null hypothesis 2 was tested:

Ho₂: There is no fixed and random effects of simple model

Finally, researchers used the multi-level analysis to test the fixed and random effects of hypothesis model on teachers' teaching effectiveness as indicated in Ho₃

Ho₃: There is no fixed and random effects of hypothesis model

Method

Survey design was employed using questionnaire as a method to collect quantitative data. A total of 3,914 population of this study consisted of 188 administrators at the school organizational level (macro) and 3,726 teachers or teaching staff at classroom level (micro) from 28 schools under the Office of Secondary Educational Service Area 25, Thailand. Multistage sampling technique followed by proportional simple random sampling technique was administered to select samples according to the two levels. Therefore, the target groups were divided into two levels, namely school-level and classroom-level. At the school-level, there were 50 schools, with 68 administrators acting as respondents. The schools and classroom were randomly selected from different school size such as small, middle, large, and extra-large size schools. Since researchers employed Hierarchical Linear Modeling (HLM), a large sample size is needed in order to find accurate group variation. Hair, Back, Babin and Anderson's (2013) proposed that the proper ratio of samples is 20:1 or 20 samples per one observable variable. Since there were 21 observable variables in this study, the required sample size was 445 samples of teachers. On this line of reasoning, simple random sampling technique was utilized to select 513 of classroom to fulfill Hair et al. (2013) suggestion that sample size should not less than 100.

Two types of survey questionnaire were used in this study catering for macro and micro levels respectively. The two types of questionnaire were administered in the Thai language to ensure that the respondents could understand about the statements. This survey questionnaire method benefits this study in terms of obtaining data more efficiently as time, energy, and costs would be minimized (Wyse, 2012), hence provides an excellent means of measuring attitudes and orientation in a large population which can, therefore, be generalized to a larger population (Gay, Mills, & Arirasian, 2012).

Results Of The Study

Results of this study are presented in accordance with the research hypothesis that is indicated above. The initial result is the descriptive results related to the three variables namely classroom-level factors, school-level factors, and teachers' teaching effectiveness. This is followed by results from HML analysis for null hypothesis testing.

Descriptive Results

Descriptive results showed that teachers' teaching effectiveness was at moderate level. Specifically, the components of teachers' teaching effectiveness satisfaction of teaching performance and participation of parents and community were identified at high level whereas academic achievement was at low level. Furthermore, descriptive results of school-level factors were generally evaluated to be at highest level such as academic leadership, school culture, and school atmosphere was evaluated to be at high level. Besides, 40 percent of the schools that researchers investigated are categorized as small size schools. On the other hand, the bio-social characteristics of teachers as classroom factors revealed that 70.18 percent of the teachers are female, 32.11 percent were 41 to 50 years old, 55.04 had a bachelor's degree, and 38.30 percent had more 20 years of teaching experience. Other classroom-level factors were found at high level such as school atmosphere, teaching performance, and social support for teachers, in descending order.

Null Model Analysis

The micro-level analysis of HML was conducted in two steps. The first step (null model) was conducted on the dependent variables without considering any independent variables. As indicated in Table 1, the results of fixed effect test showed that the total mean score of teachers' teaching effectiveness was 3.237 ($\gamma_{00}=3.237$ with a (statistical significance of 0.01). The test of random effect showed that the statistical significance for the mean of teaching effectiveness was 0.01 Wald Z= 3.619 (, and the variance in parameter estimation was 0.038, while the intraclass correlation coefficient (ρ) was 0.285. The school variance was 28.50 percent meaning that the classroom variables were able to indicate teaching effectiveness. Therefore, researchers were able to use the simple model analysis for the second step (simple model).

Table 1: Results of null model from fixed effect and random effect

Fixed effect	β	Standard Error	t-test	df	p-values
INTRCPT, γ_{00}	3.237**	0.033	99.329	48.961	<0.001
Random effect	β	Standard Error	Wald Z		p-values
School differences (U_{0j})	0.038**	0.011	3.619		<0.001
Classroom differences (r_{ij})	0.096	0.007	13.9927		<0.001

**p<0.001

Simple Model Analysis

Based on Table 2, the results of fixed effect test showed that the total mean of the teachers' teaching effectiveness was 3.208 ($\gamma_{00}=3.208$ with a statistical significance of (0.01) $t = 28.480$.(Independent variables at the classroom-level that provided positive effects on teaching effectiveness were social support for teachers ,teaching performance ,and teaching atmosphere ,with every factor having a statistical significance of 0.01 .The regression coefficient of each factor was 0.333, 0.113, and 0.171 ,respectively .This implies that promotion of social support for teachers ,of teaching performance ,and of teaching atmosphere can improve teaching effectiveness. Analysis of random effect showed that school differences(U_{0j}) having a statistical significance of 0.01 (Wald Z = 3.106) and a variance in parameter estimation of 0.007. Independent variables at the classroom-level showed variance of dependent variables at 52.62 percent, as shown in Table 2.

Table 2: Results of simple model from fixed effect and random effect

Fixed effect	β	Standard Error	t-test	df	p-values
INTRCPT, γ_{00}	3.208**	0.113	28.480	416.934	<0.001
WOMEN, γ_{10}	0.033	0.022	1.494	414.632	0.136
AGE2, γ_{20}	-0.056	0.048	-1.178	418.658	0.239
AGE3, γ_{30}	-0.084	0.056	-1.495	417.087	0.136
AGE4, γ_{40}	-0.114	0.065	-1.770	419.628	0.077
BHD, γ_{50}	-0.001	0.105	-0.012	410.120	0.990
MD, γ_{60}	0.020	0.105	0.193	410.663	0.847
EXP2, γ_{70}	0.040	0.051	0.784	421.422	0.433
EXP3, γ_{80}	0.096	0.056	1.698	421.119	0.090
EXP4, γ_{90}	0.095	0.063	1.516	421.993	0.130
EXP5, γ_{100}	0.126	0.066	1.894	421.991	0.059
SPON, γ_{110}	0.333**	0.028	11.770	421.959	<0.001
BEHAV, γ_{120}	0.113**	0.035	3.234	415.828	0.001
TEAAT, γ_{130}	0.171**	0.034	5.064	407.545	<0.001
Random effect	β	Standard Error	Wald Z		p-values
School differences (U_{0j})	0.007**	0.00237	3.106		0.002
Classroom differences (r_{ij})	0.041**	0.00292	13.892		<0.001

** $p < 0.01$

Hypothetical Model Analysis

Hypothetical model analysis includes all the independent variables for every level. Analysis of the fixed effects showed a mean of teachers' teaching effectiveness as 3.213 ($\gamma_{00}=3.213$ at a statistical significance of (0.01) $t = 6.815$.(The school-level factors)macro-level independent variables(on teaching effectiveness was not statistically significant. However, the school-level factors that provided a positive effect on teachers' teaching effectiveness were: being a large- size school and having 5-10 years of teaching experience, with a statistical significance of 0.05 ($\gamma_{83}=0.430$, $t = 1.998$), and being an extra-large size school and teaching performance with a statistically significance of 0.01 ($\gamma_{123}=0.385$, $t = 2.891$). However, being an extra-large size school and teaching atmosphere was shown to provide a negative effect on teachers' teaching effectiveness, with a statistically significance of 0.05 ($\gamma_{133}= 0.244$, $t = -1.986$). Analysis of random effects showed a decrease in values relative to the null model analysis. School differences (U_{0j}) showed a statistically significance of 0.05 (Wald Z = 1.920) and a variance in parameter estimation of 0.005. The classroom model (micro level) indicated a 37.50 percent variance of dependent variable, as shown in Table 3.

Table 3: Results of hypothesis model analysis from fixed effects and random effects

Fixed effects	β	Standard error	t-test	df	p-values
INTRCPT, γ_{00}	3.213**	0.471	6.815	334.049	<0.001
Being a small size school, γ_{01}	0.278	0.732	0.379	330.709	0.705
Being a large size school, γ_{02}	-0.100	0.183	-0.548	321.031	0.584
Being an extra large size school, γ_{03}	-0.167	0.505	-0.330	335.603	0.742
Being an academic leader, γ_{04}	-0.370	1.071	-0.346	327.762	0.730

School culture, γ_{05}	0.054	0.036	0.162	317.670	0.871
School atmosphere, γ_{06}	0.290	0.328	0.884	330.381	0.377
WOMEN, slope β_{1j}, γ_{10}	-0.033	0.064	-0.517	332.387	0.605
Being a small size school, γ_{11}	-0.042	0.085	-0.491	337.496	0.624
Being a large size school, γ_{12}	0.087	0.086	1.008	340.740	0.314
Being an extra large size school, γ_{13}	0.144	0.078	1.856	339.291	0.064
Being an academic leader, γ_{14}	0.117	0.144	0.813	340.114	0.417
School culture, γ_{15}	-0.122	0.203	-0.600	340.312	0.549
School atmosphere, γ_{16}	-0.047	0.203	-0.230	340.993	0.818
AGE2, slope β_{2j}, γ_{20}	0.049	0.124	0.396	339.471	0.693
Being a small size school, γ_{21}	-0.240	0.169	-1.421	337.359	0.156
Being a large size school, γ_{22}	-0.113	0.176	-0.641	338.771	0.522
Being an extra large size school, γ_{23}	-0.145	0.170	-0.850	339.506	0.396
Being an academic leader, γ_{24}	0.028	0.318	0.089	334.728	0.929
School culture, γ_{25}	-0.053	0.449	-0.119	332.652	0.905
School atmosphere, γ_{26}	-0.046	0.440	-0.105	339.026	0.916
AGE3, slope β_{3j}, γ_{30}	0.022	0.145	0.149	338.368	0.882
Being a small size school, γ_{31}	-0.084	0.196	-0.430	339.581	0.667
Being a large size school, γ_{32}	-0.139	0.206	-0.673	331.028	0.501
Being an extra large size school, γ_{33}	-0.110	0.199	-0.551	334.211	0.582
Being an academic leader, γ_{34}	0.234	0.382	0.613	338.354	0.540
School culture, γ_{35}	0.118	0.525	0.226	337.871	0.822
School atmosphere, γ_{36}	-0.104	0.500	-0.209	340.935	0.835
AGE4, slope β_{4j}, γ_{40}	-0.086	0.172	-0.497	338.574	0.620
Being a small size school, γ_{41}	-0.053	0.236	-0.222	336.471	0.824
Being a large size school, γ_{42}	-0.080	0.234	-0.343	335.287	0.732
Being an extra large size school, γ_{43}	-0.014	0.230	-0.060	335.955	0.952
Being an academic leader, γ_{44}	0.058	0.429	0.136	340.923	0.892
School culture, γ_{45}	0.047	0.593	0.078	339.600	0.937
School atmosphere, γ_{46}	0.256	0.573	0.447	340.985	0.655
BHD, slope β_{5j}, γ_{50}	0.119	0.454	0.262	326.195	0.794
Being a small size school, γ_{51}	-0.244	0.713	-0.342	326.346	0.733
Being a large size school, γ_{52}	-0.053	0.081	-0.652	340.638	0.515
Being an extra large size school, γ_{53}	-0.106	0.476	-0.222	326.446	0.824
Being an academic leader, γ_{54}	0.195	1.045	0.187	323.945	0.852
School culture, γ_{55}	-0.157	0.179	-0.877	339.725	0.381
School atmosphere, γ_{56}	0.084	0.209	0.401	336.488	0.689

MD,slopeβ_{6j}, γ_{60}	0.097	0.452	0.214	326.713	0.831
Being a small size school, γ_{61}	-0.196	0.713	-0.275	327.620	0.783
Being an extra large size school, γ_{63}	-0.066	0.473	-0.140	326.544	0.888
Being an academic leader, γ_{64}	0.171	0.103	0.165	323.740	0.869
EXP2,slopeβ_{7j}, γ_{70}	-0.147	0.144	-1.019	340.260	0.309
Being a small size school, γ_{71}	0.119	0.189	0.627	340.269	0.531
Being a large size school, γ_{72}	0.174	0.211	0.822	340.942	0.412
Being an extra large size school, γ_{73}	0.406*	0.185	2.198	338.297	0.029
Being an academic leader, γ_{74}	0.185	0.333	0.556	336.794	0.578
School culture, γ_{75}	0.293	0.442	0.664	340.764	0.507
School atmosphere, γ_{76}	-0.437	0.419	-1.043	340.841	0.298
EXP3,slopeβ_{8j}, γ_{80}	-0.095	0.170	-0.557	335.536	0.578
Being a small size school, γ_{81}	0.107	0.214	0.501	340.394	0.617
Being a large size school, γ_{82}	0.266	0.225	1.185	340.597	0.237
Being an extra large size school, γ_{83}	0.430*	0.215	1.998	340.645	0.047
Being an academic leader, γ_{84}	0.264	0.357	0.741	339.971	0.459
School culture, γ_{85}	-0.084	0.535	-0.156	340.863	0.876
School atmosphere, γ_{86}	-0.218	0.516	-0.422	340.909	0.673
EXP4,slopeβ_{9j}, γ_{90}	-0.130	0.182	-0.716	339.689	0.474
Being a small size school, γ_{91}	0.115	0.237	0.484	339.767	0.629
Being a large size school, γ_{92}	0.239	0.247	0.970	340.600	0.333
Being an extra large size school, γ_{93}	0.432	0.232	1.857	339.802	0.064
Being an academic leader, γ_{94}	0.053	0.413	0.128	338.487	0.898
School culture, γ_{95}	0.136	0.596	0.228	338.908	0.820
School atmosphere, γ_{96}	-0.327	0.583	-0.561	335.489	0.575
EXP5,slopeβ_{10j}, γ_{100}	-0.006	0.196	-0.028	340.373	0.978
Being a small size school, γ_{101}	0.039	0.257	0.150	340.995	0.881
Being a large size school, γ_{102}	0.107	0.261	0.410	340.072	0.682
Being an extra large size school, γ_{103}	0.348	0.246	1.415	339.978	0.158
Being an academic leader, γ_{104}	0.140	0.423	0.332	339.521	0.740
School culture, γ_{105}	-0.061	0.624	-0.098	340.990	0.922
School atmosphere, γ_{106}	-0.577	0.628	-0.919	340.342	0.359
SPON, slopeβ_{11j}, γ_{110}	0.379**	0.099	3.833	330.088	<0.001
Being a small size school, γ_{111}	0.052	0.130	0.398	335.688	0.691
Being a large size school, γ_{112}	-0.058	0.125	-0.462	336.437	0.644
Being an extra large	-0.060	0.113	-0.526	333.902	0.599

size school, γ_{113}					
Being an academic leader, γ_{114}	-0.144	0.179	-0.804	340.716	0.422
School culture, γ_{115}	0.013	0.259	0.052	331.438	0.959
School atmosphere, γ_{116}	-0.014	0.316	-0.045	337.716	0.964
BEHAV, slope β_{12j}, γ_{120}	-0.154	0.111	-1.386	340.561	0.167
Being a small size school, γ_{121}	0.089	0.156	0.570	331.336	0.569
Being a large size school, γ_{122}	0.195	0.135	1.445	339.291	0.149
Being an extra large size school, γ_{123}	0.385**	0.133	2.891	340.815	0.004
Being an academic leader, γ_{124}	0.143	0.228	0.626	338.651	0.532
School culture, γ_{125}	-0.323	0.291	-1.112	340.701	0.267
School atmosphere, γ_{126}	0.077	0.350	0.221	337.870	0.825
TEAAT, slope β_{13j}, γ_{130}	0.317**	0.107	2.957	338.552	0.003
Being a small size school, γ_{131}	-0.052	0.153	-0.338	340.831	0.736
Being a large size school, γ_{132}	-0.076	0.133	-0.569	334.930	0.570
Being an extra large size school, γ_{133}	-0.244*	0.123	-1.986	335.963	0.048
Being an academic leader, γ_{134}	0.081	0.208	0.389	338.185	0.698
School culture, γ_{135}	0.174	0.274	0.635	340.725	0.526
School atmosphere, γ_{136}	0.039	0.305	0.127	340.976	0.899
Random effect	β	Standard Error	Wald Z	p-values	
School differences (U_{0j})	0.005*	0.002	1.920	0.049	
Classroom differences (r_{ij})	0.042**	0.003	12.498	<0.001	

** $p < 0.01$; * $p < 0.05$

Discussion And Conclusion

Descriptive results showed that the overall teachers' teaching effectiveness was at moderate level. However, two of the components of teachers' teaching effectiveness showed at highest level namely satisfaction of teaching performance and the participation of parents and community. Nevertheless, low academic achievement was initially indicated by the low 2016 O-NET scores, thus low academic achievement as a component of teachers' teaching effectiveness was an inevitable result. This result is consistent with Sirisooksilp et al. (2015).

School-level factors are naturally generated by school administrators, teachers, and the involved personnel, as mentioned by Somprach et al. (2016). Somprach et al. revealed that school-level factors such as leadership, management of resources, and organizational atmosphere were significantly affecting school effectiveness while classroom-level and student-level factors are at second and third place, respectively.

Classroom-level factors were generally identified at high level and arranged in descending order as teaching atmosphere, teaching performance, and social support for teachers. This implies that good cooperation between teachers and students can generate effective teaching and learning. This is supported by Thawinkarn et al.'s study (2018) who emphasized that a safe learning environment, with no disruptions to teaching and learning, and clear school vision are important elements to improve teachers' teaching effectiveness. Besides, teachers have to play their essential roles in the direction of teaching, priority setting, assessment process, and showing leadership in teaching.

Nevertheless, school administrators should be open-minded and able to adapt to any strategy that assists the school in creating an effective teaching environment. School administrators should create an atmosphere of high expectations, requiring teachers to indicate their success with students' learning that resulting in all basic skills. Meanwhile, teachers should show their dedication to teaching by planning activities in basic skill learning for students and also by regularly following up on students' progress. This implies that positive bonds between school and homes would encourage parents to support the school mission in order to accomplish optimal results.

Results of fixed effect analysis revealed that the overall teachers' teaching effectiveness was 3.206 with a statistically significance of 0.01. This implies that classroom-level factors which acted as independent variables that provided a positive effect on teachers' teaching effectiveness were social support for teachers, teaching performance, and teaching atmosphere at significant level as 0.01. It can be concluded that promotion of social support for teachers, teaching performance, and teaching atmosphere can improve teachers' teaching effectiveness. This result is supported by Prasertcharoensuk and Tang (2017).

The school-level factors analysis showed that the mean of teachers' teaching effectiveness was 3.213 with a statistical significance of 0.01. The effect of school-level factors failed to affect teachers' teaching effectiveness when taking into account the constants in the analysis. On the other hand, school-level factors are subordinate factors that help teachers in their classroom management. Researchers would like to suggest the Office of Secondary Educational Service Area 25 to incorporate teacher development strategies to enhance their knowledge, communication skills, and teaching competencies in order to improve the educational quality.

On top of that, a demonstration of various teaching techniques and assessments has to implement and improve individual academic achievement among students. Friendly supervision and suitable information technology has to be introduced to elevate teachers' teaching effectiveness. In addition, school administrators, teachers, and other involved parties should form networking to establish a learning community so that enable the Thai society to respond to the concept of an Asian Community. Moreover, good teaching morale and ethics have to be continuously supported in order to build pride in the teaching occupation, as well as to lead students by example.

References

- Chianese, G. (2015). Developing and assessing teaching effectiveness. *Procedia – Social and Behavioural Sciences*, 191, 692-695. doi: 10.1016/j.sbspro.2015.04.218
- Gay, L. R., Mills, G. E., & Airasian, P. W. (2012). *Educational research competencies for analysis and application* (10th ed.). Boston, MA: Pearson.
- Hair, J.F., Back, W.C., Babin, B.J., & Anderson, R.E. (2013). *Multivariate data analysis* (7th ed.). [Kindle version]. Retrieved from <http://www.amazon.com/>
- Prasertcharoensuk, T. & Tang, K. N. (2017). The effect of strategic leadership factors of administrators on school effectiveness under the Office of MahaSarakham Primary Educational Service Area 3. *Kasetsart Journal of Social Sciences*, 38, 316-323.
- Sirisooksilp, S., Ariratana, W., & Tang, K. N. (2015). The impact of leadership styles of school administrators on affecting teacher effectiveness. *Procedia-Social and Behavioral Sciences*, 186, 1031-1037. doi: 10.1016/j.sbspro.2015.04.022
- Somprach, K., Prasertcharoensuk, T., Tang, K. N. (2016). Factor affecting the effectiveness of Thai secondary world class standard school. *International Journal of Learning and Teaching*, 8(1), 20-29.
- Thawinkarn, D., Tang, K. N., & Ariratana, W. (2018). Relationship between perceived directors' leadership and classroom quality of primary schools in Thailand. *Kasetsart Journal of Social Sciences*, 39, 230-235.
- Wyse, S.E. (2012). *4 main benefits of survey research*. Retrieved from www.snapsurveys.com/

The Exploration of Meanings of Study for Married Immigrant Women Becoming University Students

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Abstract

The purpose of this study is to explore the academic experiences of married immigrant women as university students and to suggest ways to support their study. This study interviewed 6 married immigrant women, and analyzed the reasons why they continued their studies, the difficulties in studying, and the coping with their difficulties. This study suggested a support plan for marriage immigrant women to foster their competence as a global leader. This study contribute to a hope that married immigrant women are able to become a part of Korean society as well as a private diplomat between Korea and their mother countries.

Keywords: *Married immigrant women as university students, academic experience, difficulty in studying, academic support plan, within-case analysis*

1. Introduction

Due to the informatization and globalization, diverse people cross the borders to emigrate, and diverse immigrants started gathering into Korea as well. With the increase of diverse types of immigrants for labor, marriage, and study, the central and even local governments established the measures for the integration through new policies and systems. In order to newly adapt themselves to Korean society, the immigrants live as new members of Korean society by overcoming various difficulties and conflicts. Especially, contrary to other types of immigrants, the married immigrant women face a turning point of new life by performing their roles as daughter-in-law, wife, and mother in Korea(Chunyang Li & Misuk, Park(2018).

According to the Ministry of Justice(2018), there are about 283,000 married immigrant women in Korea. Out of them, total 125,750 women live as complete members of Korea by acquiring Korean nationality. With the increase of married immigrant women, the Korean government established/enforced the policies for married immigrant women, and even for their husbands, children, and their families. Such policies and systems helped the married immigrant women to stably settle down in Korean society. As their children grow up, these married immigrant women look back on themselves and have interest in activities for themselves. They could contribute to society through diverse volunteer activities and also achieve the self-growth through activities for self-development. Especially, people who raise and educate children in the educational system of Korea increasingly challenge new studies. Like this, people who try hard for self-development and self-growth live a bountiful life equipped with self-consciousness and insight through free and creative thinking(Kang, Hee-Sook·Lee, Jin-Heon, 2009). Just like the married immigrant women who stably settled down, as the settlement period of immigrants gets longer, it would be necessary to have researches for self-development and self-growth.

Thus, the objective of this study is to explore the meanings of academic experience for the married immigrant women attending university of Korea, and then to suggest the measures for promoting the self-growth of married immigrant women. For this, the in-depth interview was conducted/analyzed targeting the married immigrant women entering university. The results of this study could be used as basic data for promoting the self-growth of married immigrant women in Korea.

2. Married Immigrant Women and Study

With the increase of international marriage in Korea since 1990, the legal immigration of married immigrant women began. Even though their immigration is originated from personal choice, in the hidden side, the social, economic, and political factors caused by the capitalistic system are contained(Misuk Park & Mijeong Lee(2015)). There are total 157,431 married immigrants in Korea, and out of them, 131,254 immigrants are the married immigrant women, which is about 84% of the whole. In terms of their nationality, Chinese people(37%) are the most, which is followed by Vietnam, Japan, Philippines, and Cambodia in order. Besides them, including 125,750 naturalized immigrants by acquiring Korean nationality, the total number of married immigrant women in Korea are about 283,000(The Ministry of Justice. 2018). With the increase of married immigrant women, Korean society performs the integrated support policies for helping them to stably adapt themselves to Korean society by providing diverse support policies and services. Multicultural Families Support Centers are providing language education, social adaptation education, employment education, and parents education. The married immigrant women are protected through the enactment of Multicultural Families Support Act. Such policies helped the married immigrant women to stably settle down in Korean society as a confident member of Korean society.

According to Maslow(1943), humans continuously put efforts into self-growth. He also said that humans' desires would reach the stage of unity after going through the stages from physiological desire to desires for safety,

affiliation, respect, and self-realization. Also, Kolb(1984) called the creative process of knowledge through changes in experience 'experiential learning'. Jarvis(1987) said that the context of learning and learners' environment should be all considered for learning. Like this, the experience through diverse environments and contexts is led to self-growth and self-realization. Especially, the learning experience makes learners attempt to understand and solve their problems based on their personal experiences in the past. Through the critical self-reflection and introspection, learners lead the self-growth by recomposing or resignifying the semantic system(Seo Lynne Jeong & Young Hwa Key, 2011)

Like this, the new learning experience of university life to the married immigrant women who have stably settled down in Korean life, draws new meanings of their behaviors and also provides them with opportunities for behavioral changes and self-growth. Therefore, this study aims to explore the meanings of learning through the learning experience of married immigrant women attending Korea National Open University in Korea.

3. Research Methods

This study explores the meanings of academic performance process, experienced by married immigrant women who have stably settled down in Korea while attending university in Korea. The research was conducted from October 2017 to August 2018, and the research method was based on the qualitative research. Conducting the in-depth interview targeting the married immigrant women, the meanings of academic performance were analyzed. The research participants were the six married immigrants attending Korea National Open University. Their general information is as follows.

<Table 1> General information of research participants

Section	Age	Residence period in Korea	Hometown	Race	Academic background in homeland	Major
Research participant 1	37	7Y	Harbin	Han	High school graduate	Chinese language & literature
Research participant 2	41	10Y	Shenyang	Han	High school graduate	Chinese language & literature
Research participant 3	35	8Y	Shenyang	Han	Junior college graduate	Life science
Research participant 4	35	9Y	Jilin	Han	Middle school graduate	Chinese language & literature
Research participant 5	39	9Y	Weihai	Han	University graduate	Chinese language & literature
Research participant 6	45	5Y	Heilong Jiang	Korean in China	High school graduate	Chinese language & literature

Total six research participants included four women in their 30s and two women in their 40s. They lived in Korea from five years to ten years. The homeland of all the participants was China such as Harbin, Shenyang, Jilin, Weihai, and Heilong Jiang. In terms of race, there were five Han Chinese and one Korean in China. Regarding the academic background in homeland, there were three high school graduates, one middle school graduate, one junior college graduate, and one university graduate. All the research participants are currently attending Korea National Open University. In terms of major, there were five majors in Chinese language & literature and one major in life science.

For the data collection, the in-depth interview was performed after getting the written consent of research participation first. The in-depth interview was performed 1-2 times with each participant. Each interview lasted around one hour in a quiet cafe. The interview atmosphere was free, so that the research participants would not feel pressured. When the data was saturated, the interview stopped. As all the research participants were fluent in Korean language, the interview was conducted in Korean. The in-depth interview data was recorded after receiving the consent from the research participants, and the recorded data was all transcribed.

For the data analysis, the keyword work was performed focusing on the main themes of the transcribed data. In the analysis process, it was coded in each theme word by continuously and repetitively comparing through the

repetitive comparative analysis method by Glaser & Strauss(1967). Also, the reliability and validity of this study were increased by sending the analyzed contents to the research participants through mail in order to verify them, and also sending the categorized data to a colleague qualitative researcher for the verification.

4. Research Results

1) Recognized by husband and family

The married immigrant women who immigrated in Korea through marriage felt greatly happy about being able to study. In the beginning, they went to Multicultural Center to learn Korean language and also to adapt themselves to Korean culture. After learning about how to go to university in Korea, they gradually prepared for it with teacher's help. The university education became a chance for them to be recognized by husband and his family.

"Before starting study, I felt like my husband looked down on me. After starting study, he praised and encouraged me like 'You are smart, You can do it'. When I entered university, I even received congratulatory money." (Research participant 2)

"I got praised by husband's family. They said, 'You are so great!'." (Research participant 6)

2) Adaptation to the reality of education

It was not definitely easy for the married immigrant women to attend university in Korea. There were several difficulties for them to study as the courses were based on online classes due to the characteristics of Korea National Open University. When preparing for the qualification examination with Multicultural Center, considering the characteristics of married immigrants, the Korean language teachers slowed down classes or repetitively taught in case when they could not understand. In online courses of university, however, it was tough for them to catch up fast-speaking Korean. In order to cope with this realistic problem, they were using diverse methods.

"Even when listening to online courses, not many things are memorized in head. There are some parts I cannot understand. So different from lectures I took in the past. It is hard to understand academic words." (Research participant 1)

"In the center, the teacher who taught us slowly and repetitively told us. But, in the online courses, there is almost nothing I can understand. So I studied really hard like listening to them repetitively in order to get ready for finals. Sometimes, I cannot understand anything of a course even after listening to it numerous times." (Research participant 3)

3) Study through study groups with senior students

The married immigrant women who felt hardship in university life sought for their own methods to maintain their study. Joining a study group with senior students, they provided what they could do well to senior students, and they complemented their insufficient part through senior students. As most of them majored in Chinese language & literature, they taught the grammar and vocabulary of Chinese to Korean seniors while the seniors helped them on writing reports.

"I entered the Dept. of Chinese Language. So the 2nd & 3rd-year seniors teach the subjects we don't know to us and also give feedbacks on our reports. We teach Chinese language to them. So I often go to Learning Center in weekends." (Research participant 4)

"Writing reports is the most difficult thing to me. I look for data in library, internet, and books. I get lots of help from seniors. I sometimes ask them questions and they retouch my work." (Research participant 5)

4) Happiness of helping child education

The married immigrant women used to feel afraid of child education as their Korean skills were not sufficient without understanding the school system of Korea. Especially, as the child education methods of Korean parents were different from theirs in homeland, mostly, they could not intervene in child education. After that, the child education naturally depended on father or the child solved his/her own problems, so that diverse problems occurred. In the process of preparing for the qualification examination to enter university in Korea, they learnt about the education methods, curriculum, and textbook contents of Korea. Having confidence in child education, they helped their children's learning and spent more time with them. This became a chance to obtain the emotional stability of children and also the respect for mother from children. They were feeling happy for it.

"I would like to tell other people to study. It is tough, but fruitful. If I don't study, I cannot teach my children. I don't want to become a stupid mother." (Research participant 1)

"Nowadays, when my kids are studying, I can teach math problems and help them with homework. If I didn't study, I wouldn't know anything about math exam paper. But, now, I can solve anything as I have already done it before. I can even tell the meanings of English words to them." (Research participant 2)

5) Agent for self-growth

Maslow(1970) said that self-growth would be closely related to self-realization. When the married immigrant women entered university, they got psychologically stabilized, which became a chance to have the self-growth. As an alien of Korean society, they achieved the self-growth by overcoming the discrimination and prejudices, and cultivating the new competencies through learning. This self-growth became a power to survive in Korea and also an agent for seeking for new career for better life.

"My knowledge has been increased. So I have confidence. I think I have got smarter after studying." (Research participant 3)

"My dream was to graduate from high school and university. My husband knows how serious I am. I will continuously work harder to achieve my dream." (Research participant 6)

5. Conclusions

This study explored the meanings of academic experience of the married immigrant women attending university in Korea. In the results of conducting the in-depth interview with six married immigrant women attending Korea National Open University, the meanings of academic performance were drawn as follows. First, the academic performance in university became a chance for the married immigrant women to be recognized by their families. Second, through the academic performance, they had a chance to help their child education and also to commune with children about study. Third, through study, they obtained confidence and self-esteem, which became a new turning point. Fourth, study was an agent for self-growth, so that they could continuously work hard to achieve their dreams.

Like this, the university study provided a chance of self-growth and new career to the married immigrant women. Through such researches, our society should seek for the measures for vitalizing the provision of diverse opportunities to the married immigrant women, so that they could continue their study to achieve the self-growth.

REFERENCES

- Chunyang Li & Misuk, Park(2018). Second Language Acquisition for Children of Korean and Chinese Multicultural Family. AJMAHS, Vol 8, No 3, pp367-375.
- Hee Sook Kang & Jin Heon Lee. 2009). The Effect of Self-growth Program on College Student's Self-esteem and Self-perception. Journal of Youth Welfare. Vol 11, No 2. pp43-58.
- Jarvis, P.(1987). Adult Learning in the Social Context. London: Croom Helm.
- Kolb, D. A(1984). Experiential Learning-Experience as the Source of Learning and Development. Prentice Hall.
- Maslow.A.H.(1943). A theory of human motivation. Psychological Review. Vol 50. pp370-396.
- MiSuk Park & MiJeong Lee(2015). Research on the Motivation of Marriage Immigrant Women to Continue Education in Graduate School
- Seo Lynne Jeong & Young Hwa Key(2011). A Study on the Process of the Learning Using Experiences of Pre-Older Adults in a Graduate School Program . Research HRD, 2011, Vol 13, NO 4, pp137-170.

The Future Management Of Welfarehomes For Children In Thailand In Terms Of Management Strategy, Assistance And Coordination, And Providing Welfare And Services In The Next Decade

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Abstract

The purpose of this research is to examine the future management of welfare homes for children (WHC) in Thailand in terms of management strategy, assistance and coordination, and providing welfare and services in the next decade. This research is focusing on 3 dimensions of management strategy of WHC, assistance to and coordination of the abandoned children, and providing welfare and services. In this study, the data were collected from 18 experts who have long term experience in WHC in Thailand. The 18 experts were selected according to purposive sampling and snowball sampling techniques and they were categorized into 4 groups: 1) the executives who play a role in Thailand national policy of WHC. 2) the directors who are working in the government WHC 3) the directors who work in the private WHC and 4) the social workers, academics, professors, and experts who have experience in WHC and the outcomes from the interview were created the rating scale questionnaires. The outcomes from the expert used for conclusions regarding the future management of WHC in Thailand were created according to the methodology of Ethnographic Delphi Futures Research (EDFR). The results of this study show that the future management of WHC in the next 10 years on management strategy will focus more on personnel who are working in the WHC in terms of recruiting staff and providing a fair benefit to employee. While the assistance to and coordination of the abandoned children is focusing on networking which is government organization, non-government organization, community and other organizations are working together with WHC in term of assist and coordination. And providing welfare and services of the WHC will focus more on children centralization which considering the needs of every child individually.

Keywords: *Future Management; Welfare Home for Children; Management strategy; Assistance and coordination; providing welfare and services*

Nomenclature	
EDFR	Ethnographic Delphi Futures Research
WHC	Welfare Home for Children

Introduction

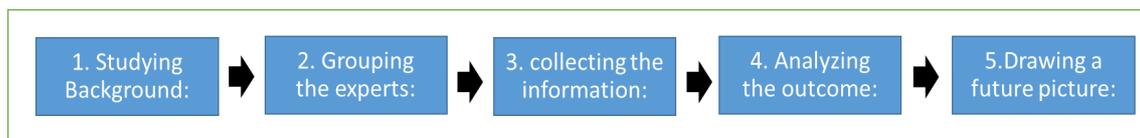
The first Thai welfare home for children was located in a Buddhist temple. The Buddhist temple is the center of the community and provides all kind of services such as religious activities, education, entertainment, and social work. It is also a belief of Thai people that if there is an abandoned child he or she should be sent to the Buddhist temple and be taken care of by the monks.(Wanvisa Siwan, 2013). The Buddhist temple is not mainly built for taking care of the abandoned children. In 1890, the government of Thailand built a temporary home for abandoned children in Bangkok as a result of the increasing number of abandoned children, and then in 1911 Thai government built the first WHC in Bangkok. Since the starting point of WHC in Thailand until now (2018) more than 400 WHC have been built all around the country and located in many places. They were safe and secure, registered, and under the supervision of the Department of Social Development and Welfare of Thailand. (Department of Social Development and Welfare, 2013)

Currently, there are 30 government WHC, 138 non-government WHC, and more than 200 non-registered located all around the country. A WHC is categorized by the needs of the children and can accommodate 6-200 children according to the accommodation, personnel, and financial support. (Department of Children and Youth, 2015) Some WHC have had to be shut down and many WHC have a potential to be shut down according to the rapid changes in terms of poor management, financial support, economic, politic, and social interest (Rapee Kamhom, 2006). As a result, the management should be concerned and relate more about the recent situation because the failure of management might affect a big number of children who stay in WHC. According to the boiled frog theory by Tichy and Sherman (1993), which explained the metaphor for the inability of people or organization to react to significant changes that occur gradually or to events which have become commonplace, the WHC in Thailand is like a frog who is sitting in boiling water, if they do not know how to handle what will be happen in the future. Most of WHC still manage in the same way, same style, and still using Child Protection Act (2003) as a core for managing the welfare home for children which is out of date and as a result, the welfare homes for children might be a candidate for resembling a frog in boiling water.

Methodology

This study deployed EDR, which is a future study about the future management of WHC in Thailand in the next decade, to construct the information from the WHC experts (Chumpol Poolparachewin, 2016). The researcher divided the procedure of this study into 5 stages (see Figure 1):

1. Studying Background: studying and collecting the information about the background of both government and private WHC by focusing on history, management style, and problems in terms of management from the beginning until now.
2. Grouping the experts: contacting the experts and asking them to be an information-giver to this study and grouping them into 4 groups for the comprehensive information from experts who have different aspects and points of view related to WHC which is 1) the executives who play a role in Thailand national policy of WHC 2) the directors who are working in the government WHC 3) the directors who work in the private WHC and 4) the social worker, academics, professors, and experts who have experience regarding WHC.
3. Collecting the information: for this stage, the researcher divided the procedure into 3 parts: 1) interview the experts and create a set of questionnaires from their information — 30 items of management strategy, 30 items of assistance and coordination, and 30 items of providing welfare and services 2) ask the experts to rate the probability of each items in the questionnaire. 3) ask the experts to confirm their answers from the first round.
4. Analyzing the outcome: gather together the information to analyze with the basic statistics such as percentile, median, inter quartile range and recruit the future management items to find the consensus from the 3 main topics (management strategy, assistance and coordination, and providing welfare and services) by rating in “high and highest level”, mode is over 3.50 and each item is confirmed with the 18 experts, scope of the quartile range is not over 1.50, and the satisfaction is over 80 percent.
5. Drawing a future picture: using the outcome from this study to draw a future picture of WHC management related to 3 main topics (management strategy, assistance and coordination, and providing welfare and services)



Results

The result from The Future Management of WHC in Thailand in the next 10 years, which contains the 90 possibility items for future management of WHC and is categorized into 3 main topics (30 items per each main topic): management strategy, assistance and coordination, and providing welfare and services.

The future management in term of management strategy of WHC which 53.33 % highest qualify and 20 % high qualify (19/30 items) in Figure 2 according to the selection criteria are (1) having a standard quality assessment system for WHC related to the content of each WHC (2) having a reasonable ratio between staff and children in WHC (3) having a shared knowledge and driving WHC into the same direction among the staff (4) developing all the skills of the staff for taking care of the children (5) creating a common sense approach and good relationship between staff, children, and WHC (6) creating values, organizational culture which benefit children in WHC (7) having a good system to manage budgets and all kinds of donations which benefit children in WHC (8) having an educational exchange program between WHC, related organizations, and the local community (9) using social media such as Facebook, Line, and Instagram for public relationship to provide information, activity, and contact with others (10) changing vision, mission, and operation related to the current situation (11) clearly changing the

laws about the identification of children who are staying in WHC (12) the framework of WHC should be flexible and rely on the situation (13) categorizing the special needs of the children more specifically (14) reducing the complicated procedure for using a budget for helping children in WHC (15) more focus on recruiting people who work with the children in WHC (16) having a good system to provide a fair benefit to people who work in WHC (17) managing the increasing number of donors, donations, and financial support properly (18) using WHC as a hub for training people in the surrounding community to assist children when they are in trouble (19) giving a chance to children who are in WHC to be a part of managing WHC.

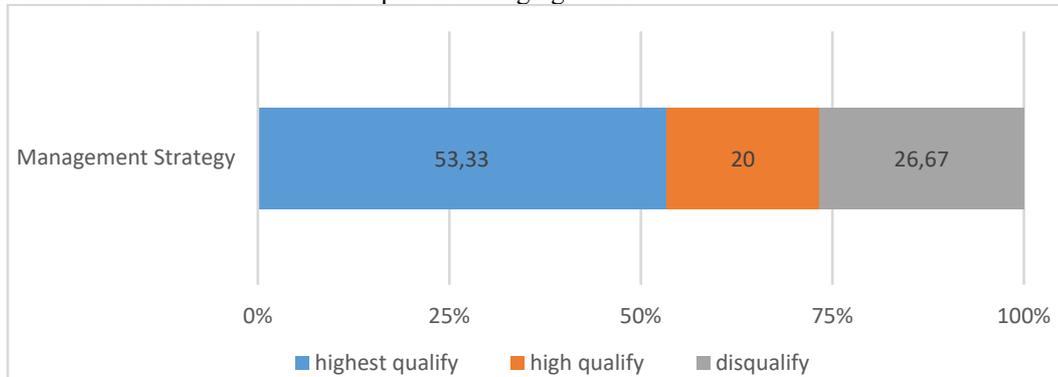


Figure 2. The result of Management strategy items which highest qualify, high qualify, and disqualify

The future management in term of assistance and coordination of WHC which 43.33 % highest qualify and 16.67 % high qualify (18/30 items) in Figure 3 according to the selection criteria are (1) using networking for screening and assisting children (2) investigating the background of children in all detail as much as possible (3) processing all kinds of documents for children in WHC should be facilitated by one officer (4) helping and healing children in WHC should be considering the relative, neighbor, and community where the children come from as the same time relatives, neighbors and the local community can play a part on helping and healing damaged children (5) cooperating with local hospitals in terms of providing child psychiatry and forensic science (6) reducing process and period of time to using the budget for helping the children (7) arranging enough budget for assistance and coordination (8) arranging budget for the changing assistance and coordination situation in the future (9) the WHC nearby should support and help each other (10) sharing the personnel and other support between WHC (11) inviting government organizations, non-government organizations, the local community, and people to get involved with WHC (12) the staff who are working in WHC has to dedicate themselves to learn more about assistance and coordination (13) planning ahead about how to handle the growing number of children who are coming to stay at WHC (14) making an individual plan for each child (15) creating a network in the community to prevent damage and help children in their community (16) assisting and coordinating in the same standard and direction (17) government WHC should be a back-up for non-government WHC in terms of assistance and coordination (18) using social media such as Line and Messenger to communicate between social workers in WHC

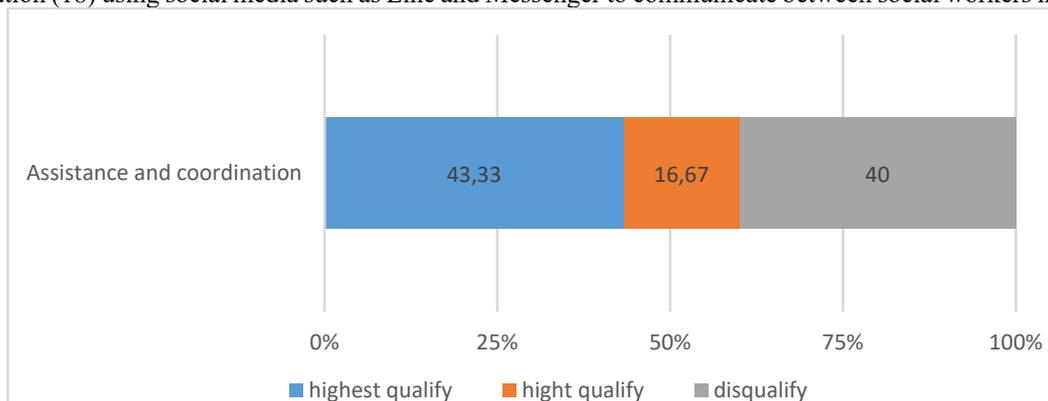


Figure 3. The result of Assistance and coordination items which highest qualify, high qualify, and disqualify

The future management in terms of providing welfare and services of WHC which 30 % highest qualify and 33.33% high qualify (22/30 items) in Figure 4 according to the selection criteria are (1) promoting more about substitute family, foster family, and adoptive family (2) reducing the procedures of searching for substitute family, foster family, and adoptive family for children in WHC (3) supporting children more about their talents and interests (4) teaching children in WHC to become a giver rather than a receiver (5) children in WHC should rely on themselves rather than rely on others (6) helping each child in WHC to develop themselves to become a quality adult (7) adjusting children's negative attitude about being children who stay in WHC (8) using all kinds of

activities for developing, healing and building life skills for children in WHC (9) providing creative activities to fulfil children’s development (10) cooperating more with community, government, religious organization, and people in this area to get involved with providing welfare and services (11) focusing more on giving love, warmth, and attention to children in WHC (12) children who stay with their relatives arranged by WHC is more beneficial than children who stay in WHC (13) creating a common sense among children in WHC to be aware that they are also a part of community (14) helping children in WHC to know about self-reliance, and how to help themselves, have courage, and self-confidence (15) creating more choices in life for children in WHC (16) keep in contact with parents, relatives, and the community where children in WHC come from (17) providing welfare and services by being aware of age, need, and development status of individual children (18) controlling the activities which are run by visitors and others should go together with WHC activities (19) involving parents and community to be a part of providing welfare and services (20) using local culture, tradition, and belief to get involved in the providing welfare and services (21) helping children to discover their talents and practice them more often (22) governments have awareness more about the immigrant children, stateless children, and foreigner children. In conclusion, the 59 items are qualified the selection criteria regarding to the 90 possibility items of future management of WHC (see Figure 5)

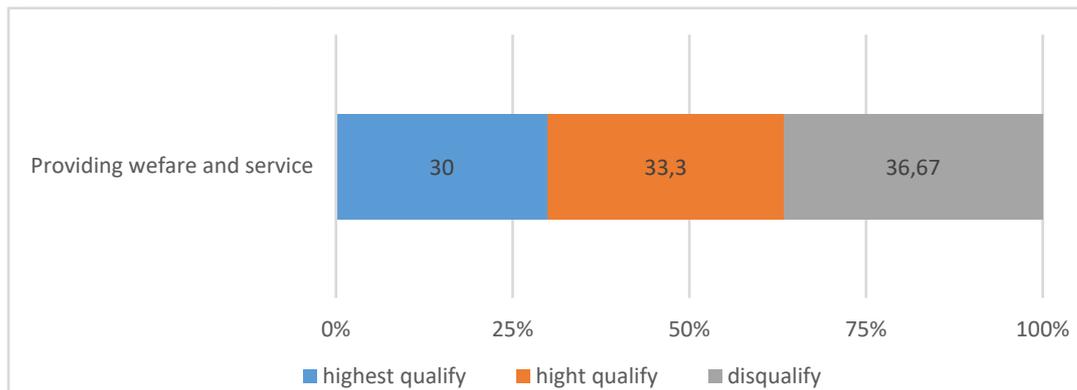


Figure 4. The result of

providing welfare and service items which highest qualify, high qualify, and disqualify

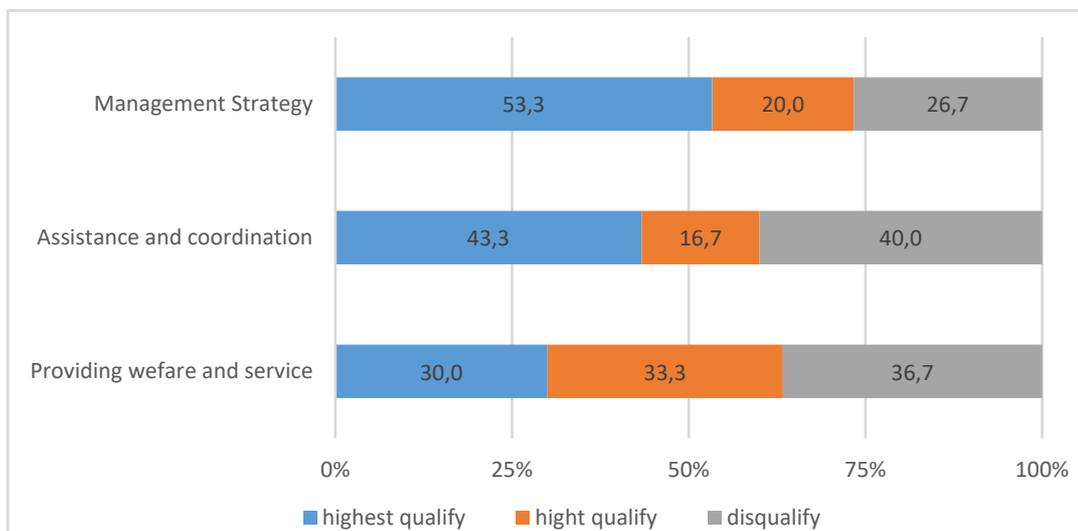


Figure 5. The total result of future

management in term of management strategy, assistance and coordination, and providing welfare and services (59/90 items) which highest qualify, high qualify, and disqualify

Conclusion

The results of this study show that the future management of WHC in the next decade in terms of management strategy is more about focusing on personnel who are working in the WHC in terms of recruiting staff and providing a fair benefit to employee. The future management WHC picture in terms of management strategy is more concerned with recruiting people to work in WHC with regard to quality of the staff, knowledge, skills, behavior, abilities, competency, attitude, human relationship, and job satisfaction. As a result, employees who are working in WHC are the key to indicate success or failure of WHC. If WHC have a good staff and each of them is an expert in their duty, self-development, and ready to learn and ability to adjust to new things, the employee will play an important role in the next decade according to the result of this study. Meanwhile WHC should provide a fair benefit to the employee, if they do not get a fair benefit, they might feel insecure and look for a new job

which gives them security in their life and at the end WHC will lose personnel and put the future of WHCs in danger.

While the results of this study also show that the assistance and coordination of the children in WHC is focusing on networking. Especially WHC, government organizations, non-government organizations, community and others organizations are working together with WHC in terms of assisting and coordination. The future management WHC picture in terms of assistance and coordination of the children in WHC will be a picture of assisting, coordinating, and working together between government organizations, non-government organizations, community and others organizations. It makes assistance and coordination system more effective than the last previous (one man show). It will be helpful, useful, and cover all dimensions in terms of assisting and coordinating and also help children to prevent the crisis when they are in trouble.

And the results of this study show that providing welfare and services of the WHC is more focusing on children centralization with consideration for the needs of every child as an individual. The future management WHC picture in terms of providing welfare and services will be considering the needs and benefit of children individually the most. According to these differences, each child has different needs and specific problems, and they need to be addressed specifically and individually, WHC cannot set up the same standard of welfare and services for every child because it might work with some child but it may not work with another child. It will help and benefit children a lot and the provision of welfare and services will more effective.

References

- Chumpol Poolparatchewin. (2016). Futures Research. Documents for Academic Seminar. Chulalongkorn University.
- Department of Children and Youth. (2015). Annual Report 2016. Bangkok: Department of Children and Youth.
- Department of Social Development and Welfare. (2013). Private Nursery and Orphanages: Qualification of Applicants, Operators, Caretakers in accordance with The Ministerial Regulations, the Rules, Procedures, and Conditions for Obtaining a License to Establish a Nursery 2006. Retrived from <http://61.19.238.233/nursery/Content/Guest/Recommend.aspx>
- Rapee Kamhom. (2006). Social welfare in Thai society. Bangkok: Prikwangraphic.
- Tichy, N. and Sherman, S. (1993). Control Your Destiny or Someone Else Will. New York: Harper.
- Wanvisa Siwan. (2013). Cultural Values change in Today's Society. Academic articles on social issues. Faculty of Social Sciences, Naresuan University.

The Global Social Responsibility Levels Of The Prospective Social Studies Teachers

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Abstract

The purpose of the study is to measure the social studies teacher candidates' level of social responsibility. In this regard, it has been tried to determine the levels of teacher candidates in terms of the variables of gender, class level, parental education level and number of siblings. The study was designed as a mixed method study. The quantitative part was conducted with survey model and the qualitative part was done with case study. The sampling of the quantitative part included 283 teacher candidates and the sampling of the qualitative part had 8 teacher candidates. Teacher candidates were selected at the level of each grade. The purposive sampling type has been utilized as the sampling type. According to the simple correlation test between the dimensions, there was a positive low level of correlation between ecological responsibility dimension and action-oriented responsibility; a positive medium level of correlation between ecological responsibility and altruist responsibility; a positive low level of correlation between ecological responsibility and national responsibility dimensions. There was a positive medium level of correlation between action-oriented responsibility and altruist responsibility. Moreover, there was a low level of correlation between altruist responsibility and national responsibility dimensions.

Introduction

Responsibility is a phenomenon ongoing from the day when the mankind exists up to the present. This phenomenon has its origin within the family, develops and shapes in time by the influence of social circle and education. Therefore, it can be regarded as the individual's fulfilling the duties and responsibilities anticipated by the society (Başer, 2015). In Turkish Language Association Turkish Dictionary (2018), the concept of responsibility is defined as the one's undertaking the consequences of his own behaviours or the outcome of any case within the realm of his own authority, personal liability and obligation. Responsibility is the individual's complying with, fulfilling his duties, respecting to the others and claiming responsibility for the consequences of his own behaviours (Erol, Elagöz and Şahbaz, 2010). Responsibility is the key point for the citizens of democratic societies (Nakamura and Watanabe-Muraoka, 2006). Individuals who have sense of responsibility act in a sound manner and judiciously in their decisions related to family, friend and inner circle in private and to society and state in general (Ergül and Kurtulmuş, 2014). Responsibility is one of the most important traits of human characteristics. A responsible individual fulfils the duties and liabilities to his own part at the right time and as is desired. Having responsibility is also the way of winning the respect, hearts and minds of people. Maybe, the first and foremost is its enabling us to have a grip on our own lives. In terms of overcoming the problems in every aspect of communal living, to have the sense of responsibility is significant. To approach the hardships of life with sense of responsibility supports us to be able to change some things (Sezer, 2008). It is expected that responsible individuals are more successful in social and communal life and attain their goals (Taylı, 2013). An official who does not duly perform his duties, a neighbour who is not beneficial to his around, an individual who cannot meet his own needs, a student who does not do his homework or have his class properly and timely is quite likely to have problems in communal living. An individual who is aware of fulfilling his/her responsibilities will be more responsive in order to do better. Thus, a more liveable world can be handed down the next generations (Aktepe, 2015).

Sense of responsibility develops as of very early ages, by the influence of the circles. The thing which ensures this feeling of responsibility to arise and maintain is the society where individuals lead their lives in. Society employs this feeling by formal and informal means such as family, law, education and so on (Akgül, 2010). Sezer (2008) also states that the source of this sense is the society and values unique to the society. From this aspect, responsibility is not an innate feeling, but a conscious gained afterwards (Taylı, 2013). The concept gains a social status through the internalization of this feeling by the individuals and the society's gaining a sense of responsibility in the way desired. This case, in literature, is defined as social responsibility. Social responsibility is the state of readiness to act in a socially responsible manner (Berkowitz and Lutterman, 1968). It is that individuals realize the social problems and get into the act for the solution of these problems (Deveci and Eryılmaz, 2017). Social responsibility can also be defined as each individual's acting so as to provide benefit to the society in which he/she lives (Akıncı-Vural and Coşkun, 2011; Toker and Tat, 2013). The control mechanism function of

the culture or societies in which we exist makes the individual's responsibility societal (Akgül, 2010). Therefore, we can state that social responsibility is a phenomenon which shapes the behaviours of individuals. Individuals having sense of social responsibility take the influence of society or circles on their behaviours into consideration (Ergül and Kurtulmuş, 2015). The ones who have sense of social responsibility adopt the cultures and values of their societies more easily (Berman, 1990). They are in tendency to help the ones who need assistance in the society (Bobo, 1991). This concept directs individuals to collaborate for a common purpose and envisages for the outcomes of this collaboration to be shared (Yılmaz, 2011). In this case, for the individuals whose sense of responsibility has less developed or who do not have this sense at all to maintain relations with the society and their social circles will get hard.

Although the fact that the fund of knowledge has increased and sharing knowledge has been getting easy in the world we live in improves the one's welfare and ease, some certain problems are also brought with it. In addition to the global environmental issues such as famine, wars, global warming, many other problems with which the societies face such as religion, race, migration, terror and so forth are making life more difficult day by day (Başer, 2015). The main problems encountered in the globalizing world are categorized as environmental and ecological problems; social, economic, political problems and intellectual issues (Kılıçoğlu, Karakuş and Öztürk, 2012). These problems have an influence upon not only a society or country but also other people out of the society which we live in. In this case, being deaf to problem encountered anywhere in the world becomes out of the question (Başer, 2015). At the present time when communication is maintained as swift as thought, problems confronted by the nations become a concern involving large masses, by reaching up to a universal dimension. In order that these problems can be solved, it becomes highly important that individuals act as a citizen of the world, i.e. a global citizen, from now on and make co-decisions (Yazıcı, 2013). All these encountered problems reveal out how important the sense of global social responsibility is in today's world. Global social responsibility is the sense of responsibility possessed in order to overcome global social issues beyond individual and local problems (Küçükşen and Budak, 2017). Globalization of social responsibility and its being considered in broader terms have widened the scope of social responsibility, and responsibilities under consideration that are intended for solving the social problems have extended to the solution of global issues (Başer, 2015). This situation assigns new roles and duties to the education provided in the schools in order to enable such a sense to be gained (Yazıcı, 2013). The fact that teachers' awareness about social responsibility has developed will also affect the viewpoints of the students whom they will educate. For this reason, it is required that teachers' social responsibility awareness must be developed just in the process when they receive their graduate education (Ergül and Kurtulmuş, 2014). It must be ensured that students recognize social problems within the scope of instruction programs implemented at various stages of education, and circumstances under which they will get into the act for the solution of problems must be established (Deveci and Eryılmaz, 2017). In this sense, it can be stated that the subject having the function of bringing forth this awareness to the students at higher education level is the subject of Community Service Practices. In the face of increasing social demands, universities have also included social responsibilities besides their primary duties such as education-training and research. It can be stated that universities, through the lectures on social responsibility, aim at raising individuals who can work towards a solution instead of being a mere spectator to the social problems. By the lectures on social responsibility (Community Service Practices) which state and foundation universities have included in their curricula, students comprehending their individual roles in lending a hand to the ones in need are going to lead the drive for building the civil society for democracy, as the adults of the future (Toker and Tat, 2013).

Community Service Practices have the quality of being a subject which aims at enabling prospective teachers to gain the sense of social responsibility both theoretically and practically, and enhancing the skills of collaboration, solidarity, effective communication and self-evaluation in the course of practice (Topluma Hizmet Uygulamaları Dersi Yönergesi/Instructional Directive for Community Service Practices/THUDY, 2011). With this instruction, prospective teachers gain skills for realizing current issues and bringing a solution to these. Prospective teachers' social consciousness, sense and awareness of social responsibility are developed (Uğurlu and Kırıl, 2011; Küçükoğlu, Ozan and Taşkın, 2016). That prospective teachers participate in various projects within the scope of social responsibility has influence over the development of their sense of responsibility (Kocadere and Seferoğlu, 2013). The fact that teaching is one of the professions requiring social responsibility demonstrates how important the gains from this instruction are. The prospective teachers who receive this instruction;

- are conscious of local problems / produce solution to these.
- are conscious of global problems / produce solution to these.
- are an active participant in solving local and global problems.
- devise new projects against local and global problems.
- take an active role in new projects against local and global problems / work in cooperation.
- establish an effective communication both in and out of the project scope while carrying out the projects.

- participate in scientific activities such as panel discussions, conference, congress, symposium and etc., as audience, speaker or organizer/supervisor.
- enhance their self-evaluation skills.
- use their creative thinking abilities and skills in all these activities (THUDY, 2011).

The development of awareness and sense of social responsibility on both individual and social bases through the subject of Community Service Practices will serve for social development. Moreover, this subject will contribute to the development of voluntariness phenomenon in individuals. The case that individuals perform works for the benefit of the society and world without looking out for their own interests sets a good example of both voluntariness and social responsibility (Saran, Coşkun, İnal-Zorel and Aksoy, 2011). Furthermore, considering that today's university students are actually the society leaders of tomorrow (Harris, Lang, Yates and Kruck, 2011), the role and importance of this subject in enabling that the role of social responsibility consciousness is gained will be understood.

While all individuals have responsibilities, it is required for some of them to act more responsibly towards this. Since teaching is a universal profession, it is significant that teachers have required qualifications and personal characteristics. In order that a society can embody responsible individuals, it is necessary that primarily teachers possess these characteristics. Ryan (1960), Good and Grouws (1979), Rosenshine and Stevens (1986) and Confrey (1990) emphasize that it is necessary for a teacher to have more outstanding traits compared to the other occupational groups. The fact that teaching is a profession holding social responsibility; teachers undertake considerable missions in shaping the societies' future; and teachers' being regarded as the figures to lead and convert the society requires the development of the sense of social responsibility during their undergraduate education (Yılmaz, 2011). It is essential that teachers, since they enable their students to gain the sense of social responsibility, have this conscious first (Deveci and Eryılmaz, 2016). Some certain branches and/or fields of teaching profession come into prominence in making the ones gain responsibility. Social Studies subject is a significant one in raising good and effective citizens. Deveci and Eryılmaz (2017) state that responsibility and social responsibility is inherent in Social Studies subject and it provides substantial contributions in citizenship education.

When the body of literature is reviewed, it is observed that studies related to responsibility, social responsibility and global social responsibility such as (Berkowitz and Lutterman, 1968; Berman, 1990; Bobo, 1991; Nakamura and Watanabe-Muraoka, 2006; Sezer, 2008; Akgül, 2010; Erol, et.al 2010; Akıncı-Vural and Coşkun, 2011; Harris, et. al 2011; Saran, et. al 2011; Yılmaz, 2011; Kocadere and Seferoğlu, 2013; Özen, 2013; Taylı, 2013; Toker and Tat, 2013; Ergül and Kurtulmuş, 2014; Selanik Ay and Dal, 2014; Yeşil, 2014; Aktepe, 2015; Başer, 2015; Başer and Kılınç, 2015; Sezer and Çoban, 2016; Deveci and Eryılmaz, 2016; Deveci and Eryılmaz, 2017; Küçükşen and Budak, 2017) are present. Studies for responsibility mainly focus on values education; studies for social responsibility are mostly dealt on corporational basis and in the scale of enterprises. As for the studies on global social responsibility (Başer 2015; Küçükşen and Budak, 2017), their being limited in number draws the attention. In education, especially for Social Studies education which is directly related to social and communal living, social responsibility and global social responsibility are considered important. In this context, the objective of this research is to evaluate the global social responsibility levels of prospective Social Studies teachers who will raise the individuals to be the teachers of future and citizens of tomorrow. Accordingly, prospective Social Studies teachers' global social responsibility levels were tried to be determined on the basis of variables of gender, class level, mother and father's educational level and number of siblings.

Method

Research Model

This study has been designed as a mixed method research. Mixed method is explained as the approach by which qualitative and quantitative methods are employed in combination (Balci, 2009). In the quantitative part of the study, descriptive survey model was used. Descriptive survey model is the research within the scope of which data are obtained in order to determine the specific features of a study group (Büyüköztürk, Kılıç Çakmak, Akgün, Karadeniz and Demirel, 2012). In the qualitative part of the study, case study was used. Case study is the method by which a social group is analyzed as based on time and space (Büyüköztürk et. al, 2012).

Study Group

For the quantitative part of this study, 283 and in the qualitative part, 8 prospective teachers participated. Prospective teachers were selected from each class level. In this sense, the sample of the study is purposeful sampling. Purposeful sampling is the most appropriate type of sampling for the research which is selected in accordance with the research objective (Balci, 2009). In this study, as the evaluation of the global social responsibility levels of prospective Social Studies teachers is aimed, this sampling type has been preferred.

The 55,5% of the prospective teachers participating in the study (f=132) is female, and the 44,5% of them (f=106) is male. Of the participant prospective teachers, 56 are the 1st year undergraduate, 73 are the 2nd year undergraduate, 61 are the 3rd year undergraduate students and 48 are at the 4th year undergraduate level. 17 of the prospective teachers are 18, 33 of them are 19, 56 of them are 20, 61 of them are 21, 33 of them are 22 years, 38 of them are up to 23 old.

In the qualitative part of the study, 8 prospective teachers participated. Prospective teachers have been determined in the way that one female and one male are present at each class level.

Data Collection Tool

In this study, in order to collect quantitative data, “The Scale for Global Social Responsibility” developed by Başer and Kılınç (2015) have been used. The scale was applied by the researchers, in the spring term of the academic year 2018-2017, to the prospective teachers at the undergraduate level of 1st, 2nd, 3rd and 4th year. In the qualitative scope of the study, questions structured as open-ended were prepared according to the dimensions (action-oriented, ecological, altruistic and national social responsibility) of the quantitative scale. The prospective teachers were asked to answer those questions in the structured interview form. In that context, the prospective teachers were addressed the following questions:

1. Have you ever taken part in social responsibility activities (Civil society organizations, benevolent associations, international organizations, Community Service Practices, voluntary activities, and so on)? State your reasons for participation.
2. What do you perform individually for protection of the environment? If you do not, state why.
3. How would your point of view be on a case/an issue which you have not experienced “by yourself” within the boundaries of Turkey (e.g. I concern / I do not concern about it.)? State the reasons for this.
4. Do you show awareness to a matter experienced in any country of the world? State the reasons for this.

Analysis of Data

Data obtained from the quantitative part of this study were analyzed by SPSS 21, by carrying out the analyses of Kolmogorov-Smirnov homogeneity test, independent samples t-test, one-way ANOVA and simple correlation. The qualitative part of the study was analyzed by descriptive analysis. Previous to the analysis, data obtained from the prospective teachers were coded, for instance; 1.F.P.T (1st year undergraduate female-prospective teacher), M.P.T. (4th year undergraduate male-prospective teacher). Afterwards, data were analyzed within the context of each question. Data obtained from this part of the study were used in order to support the quantitative part. For the purpose of ensuring the reliability of this part of the study, investigator triangulation was carried out. Investigator triangulation is expressed as the triangulation strategy as based on which data analysis is carried out by two or more researchers independently and their findings are compared (Patton, 2014). In order to ensure the reliability of the study, the other two researchers (2 Social Studies instructors as research associates) partaking in the study were asked for their opinions. Researchers gathered for the points on which they had dissented and it was tried to arrive at agreement.

Findings

In this part of the study, findings obtained through the answers that the prospective teachers have given to the scale of global social responsibility are included. Accordingly, the answers given by the prospective teachers for the scale were analyzed and evaluations were carried out in terms of the variables of gender, class level, parents’ educational background and number of siblings. In addition to this, the relation among the dimensions in the scale was revealed and presented below in tables.

Descriptive statistics for the scores which prospective teachers have received from the scale as relevant to the dimensions of action-oriented, ecological, altruistic and national social responsibility are presented in Table 1.

Table 1: Teacher candidates' global social responsibility scores

Dimension	n	Lowest	Highest	\bar{X}	ss
Action Oriented Responsibility (12 items)	238	12	60	43,90	8,3
Ecological responsibility (5 items)	238	5	25	21,40	3,54
Altruist Responsibility (7 items)	238	7	35	26,32	3,4
National responsibility (6 items)	238	6	30	23,06	3,32
Global social responsibility (35 items)	238	30	150	109,27	14,43

When the lowest, middle and highest scores for awareness that can be obtained from the dimensions in the scale are examined, it is counted as the lowest score 12 (12x1), the middle score 30 (12x2,5) and the highest score 60 (12x5) in the dimension for action-oriented responsibility; the lowest score 5 (5x1), the middle score 12,5 (5x2,5) and the highest score 25 (5x5) in the dimension for ecological responsibility; the lowest score 7 (7x1), the middle score 17,5 (7x2,5) and the highest score 35 (7x5) in the dimension for altruistic responsibility; the lowest score 6 (6x1), the middle score 15 (6x2,5) and the highest score 30 (6x5) in the dimension for national responsibility.

Considering the findings in Table 1, as based on these scores, it has been found out that the action-oriented, ecological, altruistic and national responsibility scores of prospective teachers are above the middle score. The case in which these scores indicating prospective teachers' action-oriented, ecological, altruistic and national responsibilities differ according to gender variable was investigated and the findings obtained in consequence of the independent samples t-test performed for the mentioned case are presented in Table 2.

Table 2: Independent t-test results of teacher candidates, according to the gender regarding the dimensions of the global social responsibility scale

Dimensions	Gender	n	\bar{X}	ss	t	p
Action Oriented	Female	132	44,83	8,47	1,934	0,54
	Male	106	42,75	7,97		
Ecological	Female	132	21,61	3,84	,984	0,326
	Male	106	21,15	3,14		
Altruist	Female	132	27,06	3,24	3,881	,000*
	Male	106	25,41	3,31		
National	Female	132	22,61	3,23	-2,346	,020*
	Male	106	23,62	3,38		

*p<,05

When Table 2 is reviewed, it is seen that the averages of the altruistic and national responsibility scores received by the prospective teachers differ according to gender variable (p=0,00, p=0,020 p<0,05). Besides this, between the scores for ecological responsibility and the ones for action-oriented responsibility, a statistically significant difference has not been detected. As regards to the altruistic responsibility, female students have a higher score average (\bar{X} =27,06) than male students have (\bar{X} =25,41); but for the average of national responsibility scores, it is higher in the case of male students (\bar{X} =21,59) compared to female students (\bar{X} =22,61).

Another variable in the research is class level. For the class level, findings relevant to the students' action-oriented, ecological, altruistic and national responsibility scores are included in Table 3.

Table 3: Descriptive statistics and one-way anova of teacher candidates according to the class level regarding the dimensions of the global social responsibility scale

Dimension	Grade	F, \bar{X} , SS			Anova Results				
		n	\bar{X}	ss	S.V.	S. S.	sd	M.S.	f
Action Oriented	1. Grade	56	45,57	9,43	B. G.	303,656	3	101,219	1,480
	2. Grade	73	43,19	8,01	W. G.	15999,924	234	68,376	
	3. Grade	61	42,69	7,66	Total	16303,580	237		
	4. Grade	48	44,56	7,96					
	Total	238	43,90	8,29					
Ecological	1. Grade	56	22,07	3,96	B. G.	134,659	3	44,886	3,692
	2. Grade	73	21,96	2,92	W. G.	2844,618	234	12,156	
	3. Grade	61	21,16	3,37	Total	2979,277	237		
	4. Grade	48	20,08	3,83					
	Total	238	21,40	3,55					
Altruist	1. Grade	56	27,55	3,56	B. G.	137,433	3	45,811	4,209
	2. Grade	73	26,38	3,09	W. G.	2546,656	234	10,883	

	3. Grade	61	25,80	3,28	Total	2684,088	237		
	4. Grade	48	25,46	3,33					
	Total	238	26,32	3,37					
National	1. Grade	56	22,77	3,000	B. G.	54,824	3	18,275	1,663
	2. Grade	73	23,78	3,08	W. G.	2571,230	234	10,988	
	3. Grade	61	22,67	3,59	Total	2626,055	237		
	4. Grade	48	22,81	3,64					
	Total	238	23,06	3,33					

When Table 3 is reviewed, it is realized that the prospective teachers' ecological and national responsibility scores are very close. In addition, it has been observed that a difference exists in their action-oriented and altruistic responsibility scores. In order that the differentiation in these scores received by the students in terms of the variable of class level can be analyzed, one-way analysis of variance has been carried out. While a statistically significant difference according to class level was found between the action-oriented responsibility and altruistic responsibility scores obtained by the prospective teachers; a significant difference between their ecological and national responsibility scores was not found ($F=3,692, p<,05$; $F=1,480, p<,05$; $F=4,209, p<,05$; $F=1,663, p<,05$). The Tukey test comparison of the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores as based on the variable of class level was made. Relevant results are given in Table 4.

Table 4: Tukey test comparison results for the class level variable of the dimensions in the global social responsibility scale for the prospective teachers

Dimensions	Class Level	Mean	Standard error	P
Ecological	1 st year 4 th year	1,99*	,66	,021
	2 nd year 4 th year	1,88*	,65	,021
Altruistic	1 st year 3 rd year	1,75*	0,61	,023
	1 st year 4 th year	2,10*	,65	,008

Based on Table 4, for the prospective teachers' ecological responsibility scores, a significant difference between the 1st and 2nd year and 4th year was found, in favour of the 1st and 2nd year undergraduate students. When their altruistic responsibility scores were examined, a significant difference between the 1st year and 3rd and 4th year was found, in favour of the 1st year undergraduate students. As is viewed overall, we can mention that the prospective teachers' responsibility levels decrease as the stages at which they receive education rise.

In the research, the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores were also examined according to the age.

Table 5: Descriptive statistics and one-way anova of teacher candidates according to the age regarding the dimensions of the global social responsibility scale

Dimension	Age	F, \bar{X} , SS				Anova Results				
		n	\bar{X}	ss	S.V.	S. S.	sd	M.S.	f	p
Action Oriented	18	17	46,	12,44	B. G.	60,730	5	12,146	,966	,440
	19	33	44,36	7,39	W. G.	2918,547	232	12,580		
	20	56	44,14	8,20	Total	2979,277	237			
	21	61	41,79	7,08						
	22	33	45,12	8,99						
	Other	38	44,53	8,00						
	Total	238	43,90	8,29						
Ecological	18	17	21,24	4,98	B. G.	421,868	5	84,374	1,233	,295
	19	33	22,18	3,64	W. G.	15881,712	232	68,456		

	20	56	21,93	3,27	Total	16303,580	237		
	21	61	21,19	3,10					
	22	33	20,88	3,76					
	Other	38	20,82	3,59					
	Total	238	21,40	3,55					
Altruist	18	17	26,47	4,32	B. G.	104,426	5	20,885	1,878 ,099
	19	33	27,73	2,68	W. G.	2579,662	232	11,119	
	20	56	26,54	3,29	Total	2684,088	237		
	21	61	25,64	3,09					
	22	33	26,2	3,55					
	Other	38	25,87	3,60					
	Total	238	26,32	3,37					
National	18	17	23,12	3,12	B. G.	67,853	5	13,571	1,231 ,295
	19	33	22,79	3,36	W. G.	2558,202	232	11,027	
	20	56	23,57	2,98	Total	2626,055	237		
	21	61	23,03	3,28					
	22	33	21,94	3,28					
	Other	38	23,55	3,90					
	Total	238	23,06	3,33					

When Table 5 is reviewed, it is seen that the scores for prospective teachers' action-oriented, ecological, altruistic and national responsibility are very close. One-way analysis of variance was carried out so that the differentiation of prospective teachers' responsibility scores as based on their ages could be investigated. A statistically significant difference in the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores according to the age has not been found ($F= ,966, p<,05$; $F= 1,233, p<,05$; $F= 1,878, p<,05$; $F= 1,231, p<,05$). In the research, the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores were also analyzed according to the mother educational level.

Table 6: Descriptive statistics of and one-way anova teacher candidates according to the mother educational level regarding the dimensions of the global social responsibility scale

E, \bar{X} , SS		Anova Results								
Dimension	mother's educational status	n	\bar{X}	ss	S.V.	S. S.	sd	M.S.	f	p
Action Oriented	Primary school	141	44,28	7,96	B. G.	33,640	5	6,728	,530	,754
	Middle School	36	41,92	9,07	W. G.	2945,637	232	12,697		
	High school	29	46,45	7,34	Total	2979,277	237			
	Under graduate	6	47,50	12,18						
	Graduate	14	37,71	8,73						
	Not literate	12	44,58	5,57						
	Total	238	43,90	8,29						
Ecological	Primary school	141	21,62	3,28	B. G.	969,731	5	193,946	2,934	,014
	Middle School	36	20,78	4,17	W. G.	15333,849	232	66,094		
	High school	29	21,48	3,48	Total	16303,580	237			

	Under graduate	6	22,00	3,29					
	Graduate	14	20,57	3,55					
	Not literate	12	21,17	4,97					
	Total	238	21,40	3,55					
Altruist	Primary school	141	26,48	3,20	B. G.	85,251	5	17,050	1,522,184
	Middle School	36	25,64	3,97	W. G.	2598,838	232	11,202	
	High school	29	25,93	3,66	Total	2684,088	237		
	Under graduate	6	27,00	3,41					
	Graduate	14	25,36	2,71					
	Not literate	12	28,25	2,86					
	Total	238	26,32	3,37					
National	Primary school	141	23,14	3,44	B. G.	17,054	5	3,411	,303 ,911
	Middle School	36	22,75	3,41	W. G.	2609,001	232	11,246	
	High school	29	23,31	3,12	Total	2626,055	237		
	Under graduate	6	23,00	1,79					
	Graduate	14	23,36	3,95					
	Not literate	12	22,17	2,20					
	Total	238	23,06	3,329					

When Table 6 is reviewed, it is realized that the scores for prospective teachers' ecological, altruistic and national responsibility are very close. However, a differentiation has been observed in their action-oriented responsibility scores. One-way analysis of variance was carried out in order that the differentiation of the prospective teachers' these responsibility scores mentioned as based on the educational level of mother could be examined. A significant difference in the prospective teachers' ecological, altruistic and national responsibility scores according to the age has not been found ($F=,530, p<,05$; $F= 1,522, p<,05$; $F= 0,303, p<,05$). However, in their scores for action-oriented responsibility, a statistically significant difference has been found.

Tukey test comparisons of prospective teachers' action-oriented, ecological, altruistic and national responsibility scores in terms of the variable of mother educational level was performed. Relevant results are given in Table 8.

Table 7: Tukey test comparison results of teacher candidates, candidates according to mother educational level the dimensions of the global social responsibility scale

Dimensions	Mothers Educational Status	M.D.	Std. Error	p
Action Oriented	Primary School Graduate	6,57*	2,27	,049
	High School Graduate	8,73*	2,64	,014

According to Table 7, in terms of action-oriented responsibility, a statistically significant difference has been found between the ones whose mothers received the primary and high school education and the ones who completed their postgraduate studies, in favour of mother educational level at postgraduate education. Based on this, we can state that action-oriented responsibility levels increase as mother educational level increases.

In the research, the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores according to the variable of father educational level were also analyzed.

Table 8: Descriptive statistics and one-way anova of teacher candidates according to father educational level regarding the dimensions of the global social responsibility scale

E, \bar{X} , SS		Anova Results								
Dimension	Father educational level	n	\bar{X}	ss	S.V.	S. S.	sd	M.S.	f	p

Action Oriented	Primary school	9	44,78	7,18	B. G.	133,602	5	26,720	2,198 ,055
	Middle School	6	44,28	7,80	W. G.	2759,179	227	12,155	
	High school	5	42,68	9,50	Total	2892,781	232		
	Under graduate	2	43,10	10,0					
	Graduate	5	39,60	9,02					
	Not literate	4	44,25	8,66					
	Total	2	43,90	8,23					
Ecological	Primary school	9	21,80	3,13	B. G.	263,684	5	52,737 ,775 ,569	
	Middle School	6	21,57	3,07	W. G.	15445,046	227	68,040	
	High school	5	21,03	4,27	Total	15708,730	232		
	Under graduate	2	21,14	3,18					
	Graduate	5	22,20	3,35					
	Not literate	4	16,25	6,75					
	Total	2	21,42	3,53					
Altruist	Primary school	9	26,74	2,75	B. G.	57,484	5	11,497 1,037 ,397	
	Middle School	6	26,07	3,71	W. G.	2516,232	227	11,085	
	High school	5	26,64	3,92	Total	2573,717	232		
	Under graduate	2	25,19	2,98					
	Graduate	5	25,40	1,82					
	Not literate	4	25,75	3,78					
	Total	2	26,36	3,33					
National	Primary school	9	23,50	3,42	B. G.	54,774	5	10,955 1,013 ,411	
	Middle School	6	23,03	3,17	W. G.	2455,835	227	10,819	
	High school	5	22,85	3,22	Total	2510,609	232		
	Under graduate	2	22,23	3,10					
	Graduate	5	21,2	3,70					
	Not literate	4	24,00	3,56					
	Total	2	23,08	3,29					

When Table 8 is reviewed, it is seen that the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores are very close. One-way analysis of variance was carried out in order that the differentiation of the prospective teachers' these responsibility scores mentioned as based on the educational level of father could be examined. A significant difference in the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores according to the age has not been found ($F= 2,198, p<,05$; $F= ,775, p<,05$; $F= 1,037, p<,05$; $F= 1,013, p<,05$).

In the research, the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores according to the number of siblings were also analyzed.

Table 9: Descriptive statistics and one-way anova of teacher candidates according to number of siblings regarding the dimensions of the global social responsibility scale

E, \bar{X} , SS		Anova Results								
Dimension	number of siblings	n	\bar{X}	ss	S.V.	S. S.	sd	M.S.	f	p
Action Oriented	1	5	44,67	8,84	B. G.	38,504	3	12,835	1,018 ,385	
	2	6	44,38	7,67	W. G.	2938,213	233	12,610		

	3 and more	1	43,41	8,54	Total	2976,717	236		
	No siblings	7	40,57	4,28					
	Total	2	43,86	8,29					
Ecological	1	5	22,08	3,30	B. G.	149,080	3	49,693	,721 ,540
	2	6	21,24	2,98	W. G.	16052,043	233	68,893	
	3 and more	1	21,26	3,85	Total	16201,122	236		
	No siblings	7	20,14	4,74					
	Total	2	21,40	3,55					
Altruist	1	5	26,73	3,27	B. G.	24,211	3	8,070	,709 ,548
	2	6	26,24	3,16	W. G.	2652,684	233	11,385	
	3 and more	1	26,26	3,47	Total	2676,895	236		
	No siblings	7	24,86	4,30					
	Total	2	26,31	3,37					
National	1	5	22,39	3,61	B. G.	42,256	3	14,085	1,271 ,285
	2	6	22,95	2,92	W. G.	2582,664	233	11,084	
	3 and more	1	23,36	3,41	Total	2624,920	236		
	No siblings	7	24,14	3,34					
	Total	2	23,07	3,34					

When Table 9 is reviewed, it is seen that the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores are very close. One-way analysis of variance was carried out in order that the differentiation of the prospective teachers' these responsibility scores as based on the number of siblings could be examined. A significant difference in the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores according to the number of siblings has not been found ($F= 1,018, p<,05$; $F= ,721, p<,05$; $F= ,709, p<,05$; $F= 1,271, p<,05$).

Within the scope of the study, the relation among the prospective teachers' action-oriented, ecological, altruistic and national responsibility scores was also analyzed, and relevant results are presented in Table 12.

Table 10: Arithmetic mean, standard deviation and correlation values of variables

Dimension	\bar{X}	ss	1	2	3	4
1. Ecological Responsibility	43,90	8,29	1	,283**	,419**	,209**
2. Action Oriented Responsibility	21,40	3,55		1	,490**	,195**
3. Altruist Responsibility	26,32	3,37			1	,124**
4. National Responsibility	23,06	3,33				1

Considering the relation for the dimensions included in Table 10, low degree of positive correlation ($r=,283, p<,01$) between ecological responsibility and action-oriented responsibility; medium degree of positive correlation ($r=,419, p<,01$) between ecological responsibility and altruistic responsibility; and low degree of positive correlation ($r=,209, p<,01$) between ecological responsibility and national responsibility have been found. Also, medium degree of positive correlation ($r=,490, p<,01$) between action-oriented responsibility and altruistic responsibility, and low degree of positive correlation ($r=,195, p<,01$) between action-oriented responsibility and national responsibility have been found. Low degree of positive correlation ($r=,124, p<,01$) between altruistic responsibility and national responsibility has been found.

The findings obtained from the quantitative data in the study are as introduced above. Additionally, the reasons why the prospective teachers had developed action-oriented, ecological, altruistic and national responsibility were intended to be determined, as well. Based on this, four (4) questions were directed to the two (2) each of the prospective teachers from every stage of undergraduate education. The answers they gave to those questions were presented below.

The question "Have you ever taken part in social responsibility activities (Civil society organizations, benevolent associations, international organizations, Community Service Practices, voluntary activities, and so on)? State your reasons for participation." was directed to the prospective teachers. 5 of the prospective teachers stated that they had participated, and 3 of them stated that they had not. In the study, prospective teachers have given more than one answer to the questions. For this reason, the number of frequency is not equal to the number of prospective teachers participating in the study. Data obtained in this scope and information related to their frequencies are included in Table 11.

Table 11: Statistical data for the reasons of prospective teachers' taking in the social responsibility activities

Views	Participants	F
Lending assistance to the ones who need	1.F.P.T.-3.F.P.T.-4.M.P.T.	3
That helping the ones who need makes me happy	3.F.P.T.-4.F.P.T.	2
That I like taking responsibility and working in cooperation	3.M.P.T.-4.F.P.T.	2
Its enabling individual to get more active	3.M.P.T.	1
Making the ones who need happy	4.M.P.T.	1
That there has been no one to direct me in this way	2.F.P.T.-2.M.P.T.	2
That I do not have time	1.M.P.T.-2.M.P.T.	2
That I am not interested in these issues	2.M.P.T.	1
Total	8	14

As based on Table 11, it is realized that the prospective teachers have or have not taken their own parts in social responsibility activities due to different reasons. The prospective teachers stating that they have participated in the activities act in this way mostly in order to lend assistance to the ones in need (f=3). As for the prospective teachers stating that they have not participated in the activities, they put forward the reasons for not taking part through the opinions that there has been no one to direct me (f=2) and that I do not have time (f=2). Some of the prospective teachers answered this question of the study as the following:

3.M.P.T. *"I have taken part. I think that an individual must perform works in order to contribute to the nature and the society. This case enables the one to gain values such as responsibility and cooperation."*

4.M.P.T. *"I have participated in the social responsibility activities. My reason for doing so was that I was supposed to take part in the activities for some subjects. My aim was to aid my circle and the society, to enable that they were pleased, and to make them happy."*

The second question of the qualitative part of the study is "What do you perform individually for protection of the environment? If you do not, state why.". All of the prospective teachers have stated that they engage in the activities for protection of the environment. Data obtained by this question and frequencies are included in Table 12.

Table 12: Statistical data for the prospective teachers' views on the protection of the environment

Views	Participants	F
Warning the ones who throw litter	1.M.P.T.-2.F.P.T.- 4.F.P.T.-	4
To pick and throw the rubbish I notice around into litter bin	4.F.P.T.	3
Not doing anything	2.M.P.T.-2.F.P.T.-4.F.P.T.	2
Participating in the activities of environmental cleanup	2.M.P.T.-3.F.P.T.	1
Denouncing the problems faced with to the authorities	3.F.P.T.	1
Trying to keep the environment clean	3.M.P.T.	1
Not to use environmentally hazardous substances	2.F.P.T.	1
Sharing via social media to create awareness	1.F.P.T.	1
Following the current news related to the environment	4.F.P.T.	1
Informing the ones who apply disinfectant wrong	4.F.P.T.	1
Total	4.M.P.T.	16

As is seen from Table 12, it can be stated that the prospective teachers take part in different activities for the protection of the environment. The prospective teachers have expressed their views mostly as warning the ones who throw litter (f=4) and picking and throwing the rubbish I notice around into litter bin (f=3). Accordingly, it can be said that the prospective teachers' behaviours towards protecting the environment are generally for the rubbish thrown around. Some of the prospective teachers answered this question of the study as the following:

1.M.P.T. *"I warn the people and children around me. By telling about the mistakes they make, I enable them not to make again."*

2.M.P.T. *"I try to pick and throw it into the waste bin when I see around, on the ground. I do not think I do anything else."*

The question of "How would your point of view be on a case/an issue which you have not experienced "by yourself" within the boundaries of Turkey (e.g. I concern / I do not concern about it.)? State the reasons for this." was directed to the prospective teachers, as the third question of this study. 6 of the prospective teachers answered the question in the way that they concerned; 1 of them stated that it was based upon what the issue was; and 1 of them answered as I do not concern about it. Data obtained in this context and information on the frequencies are included in Table 13.

Table 13: Statistical data for the prospective teachers' concerning about the issues encountered in Turkey

Views	Participants	F
The idea that it is also possible for me to experience the same cases/issues one day	3.F.P.T.-2.F.P.T.-4.M.P.T.	3
That being aware towards social problems is a duty of every effective citizen	4.F.P.T.-4.M.P.T.	2
Being able to understand people by feeling empathy	3.M.P.T.-3.M.P.T.	2
That the problems encountered in my country also affect me	4.F.P.T.	1
I care about the problems related to human and environment	1.M.P.T.	1
If the problem is a particular concern to us, we have to be aware	1.F.P.T.	1
The problems which others experience are not my concern	2.M.P.T.	1
Total	8	11

The prospective teachers have stated that they would concern about the problems encountered in Turkey, by the reason of the idea that it is also possible for me to face with the same issue one day (f=3); based on the fact that being aware towards social problems is the duty of an effective citizen (f=2) and in order to be able to understand people by feeling empathy (f=2). As for the prospective teacher stating that it depends on what the matter is, the answer has been given as we have to be aware if the problem is a particular concern to us (f=1). The prospective teacher who has given the answer 'I do not concern' explained the reason for this by saying 'the problems which others experience are not my concern' (f=1). Some of the prospective teachers answered this question of the study as the following:

2.F.P.T. *"Of course, I concern about a problem encountered. Because every issue arising in our country should be a particular concern to us. If we are not experiencing it today, this does not mean that we will not face with this problem tomorrow."*

3.F.P.T. *"Sure, I concern. Since I think that it is possible to happen to me or people around me, I do everything that I can."*

The prospective teachers were finally asked for giving an answer to the question of "Do you show awareness to a matter experienced in any country of the world? State the reasons for this.". 6 of the prospective teachers have stated that they concern; 1 of them answered in the way that I do not concern and 1 in the way that I partially concern. Data obtained in this context and information on the frequencies are included in Table 16.

Table 14: Statistical data for the prospective teachers' concerning about the issues encountered around the world

Views	Participants	F
That the issues encountered in the globalizing world concern the whole humanity closely	4.F.P.T.-4.M.P.T.	2
That the cases happening in immediate surroundings affect us more	2.F.P.T.	1
Common problems related to the nature and humanity should be a matter of concern	1.M.P.T.	1
That the happenings to innocent people make me sad	1.F.P.T.	1
That a case occurring anywhere also affects other countries	4.M.P.T.	1
That our being aware towards social problems is assumed by our religion	4.M.P.T.	1
The probability that similar problems can be encountered in our country	4.M.P.T.	1
That only the situation of Turkish people and Muslims is a concern to me	3.M.P.T.	1
Total	8	9

The prospective teachers have stated that they would concern the problems experienced around the world by reason of the fact that problems encountered in this globalizing world are definitely of concern to the whole humanity (f=2). The prospective teacher who has given the answer 'I do not concern' explained the reason for this by saying 'the cases happening in the immediate surroundings affect us more' (f=1). Also, the prospective teacher stating a partial concern has explained the reason of this by putting forward the idea that only the situation of Turkish people and Muslims is a concern to me (f=1). Some of the prospective teachers answered this question of the study as the following:

1.F.P.T. *"Yes, I show awareness. Ultimately, we are all human and I believe that innocent people are everywhere. No one deserves to see wars and cruelty."*

4.F.P.T. *"Sure, I show awareness to the global matters. Even if I were not a citizen of the country where the problem was being experienced, I would act responsibly by approaching on the basis of humanitarian values. At the same time, any problem encountered anywhere in the globalizing world will also affect the other countries."*

Discussion And Conclusion

Considering the results of the study, while a statistically significant difference according to gender variable has been found in the altruistic dimension in favour of women and in the national responsibility dimension in favour of men, a significant difference has not been found in the other dimensions. In a study carried out by Berkowitz and Lutterman (1968), a significant difference in favour of women was revealed. Moreover, Akbaş (2004) found that females were more responsible than males, as based on gender variable. In the study by Abdi Golzar (2006), it was also observed that a significant difference was present in favour of women. In the research which Ercan (2009) carried out with the study group involving secondary school teachers, a significant difference according to gender variable was detected in favour of females. In the study which Altunay and Yalçınkaya (2011) performed with the participation of prospective teachers, a significant difference was again found in favour of women. In the study by Taylı (2013), with a study group consisting of high school students, a significant difference in favour of female students was found. Female students mostly have higher academic achievement during school years, as compared to male students (Paulson, 1996: 205). When considered that there is a positive relationship between achievement and responsibility (Lickel, Schamer and Hamilton, 2003; Wentzel, 1991), it is expected that the responsibility levels will be high for the female students demonstrating a higher academic achievement, in parallel. The fact that girls are raised so as to be more responsible due to the reasons arising from gender roles as of very early ages while being brought up supports this consequence. The case that the significant difference in the national responsibility dimension is in favour of male prospective teachers shows similarity with the results of the research which Küçükşen and Budak (2017) carried out with the high school students. That a significant difference according to gender variable could not be found between the individual and social responsibility scores within the scope of the research which Özen (2009) performed on a study group including primary school eighth graders also promotes this information attained at as a result of the research. Also, in the study which Başer (2015) carried out with prospective teachers and Sezer (2008) performed on a study group consisting of primary school students, a significant difference between genders was not detected. Similarly, Şahan (2011) did not attain at a significant difference as based on the variable of gender for the 8th graders, in the study within the scope of which those students' sense of responsibility was analyzed.

When the variable of class level is considered, in the altruistic and ecological responsibility dimensions, significant difference has been found. As based on the altruistic dimension, the 1st and 2nd year undergraduate students are more responsible than the 4th year ones. As related to the ecological dimension, 1st year undergraduate students are more responsible than the 3rd and 4th year ones. In other words, what is understood from this, lower stage of class has developed more responsibility as compared to the higher-stage class level. Various studies supporting this conclusion have been encountered in the body of literature. Duman (2014) reached at the result indicating that in comparison with the twelfth graders, the eleventh graders have more positive views on their schools' fulfilling the duties related to social responsibility. In their papers, Reason, Andrew and Kee (2013) concluded that continuing education at university level has a positive effect on the development of responsibility. However, in the study carried out by Başer (2015), differentiation according to the class level variable was not observed.

According to the variable of mother educational level, significant difference appeared in the action-oriented responsibility dimension. This difference is for the level of postgraduate education, against the level of primary and high school education. In the study by Taylı (2013), it was seen that the mother educational level had positive effect on the development of sense of responsibility. Also, in the study which Aladağ (2009) performed on a study group including primary school students, a similar result was attained at. Özen (2009) arrived at significant difference in the social responsibility levels according to the variable of mother educational level. According to this, as the mother's educational level rises, the levels of children's undertaking responsibilities increase. Since the ones who raise the child are mothers as prescribed by social role, we can state that mother's educational level has a positive influence upon the child's undertaking responsibility. Besides, Altunay and Yalçınkaya (2011) analyzed the prospective teachers' opinions on traditional, universal and hedonistic values according to mother educational level in their research, but a significant difference could not be found.

In the study, significant difference has not been found as based on the variable of father educational level. The study carried out by Başer (2015) and the study by Altunay and Yalçınkaya (2011) support this. But, in the research that Özen (2009) performed, significant difference was found in the social responsibility levels according to the variable of father educational level. According to this, if father is high school graduate or postgraduate, students' individual and social responsibility levels become significantly higher compared to all other educational levels of father. Duman (2014) obtained the result that students whose fathers were primary school graduate had stated positive views on the schools' fulfilling their duties related to social responsibilities more than the ones whose

fathers were college graduates or postgraduate. Taylı (2013), in the analysis made by controlling the influence of gender, introduced that father's educational background was determinative on responsibility. In this regard, it can be thought that students' individual and social responsibility levels also increase as father educational level rises.

In consequence of the research, a significant difference in all dimensions at the levels of global social responsibility of the prospective social studies teachers has not been found as based on the variable of the number of siblings. However, in the study by Özen (2009), a significant difference was found by the number of siblings. It was seen that the ones who were three siblings developed responsibility more. Actually, it is expected that the oldest sibling in a family has developed the sense of responsibility more. But in this study, the number of siblings is not regarded as an influential variable.

Based on the simple correlation test performed among the dimensions, low degree of positive correlation between ecological responsibility and action-oriented responsibility; medium degree of positive correlation between ecological responsibility and altruistic responsibility; and low degree of positive correlation between ecological responsibility and national responsibility were realized. Medium degree of positive correlation between action-oriented responsibility and altruistic responsibility, and low degree of positive correlation between action-oriented responsibility and national responsibility were found. Low degree of positive correlation between altruistic responsibility and national responsibility was found. In other words, as understood from this point, all dimensions interact.

The qualitative part has been prepared to promote the quantitative part of the study. Considering the results for this, it is seen that the prospective teachers have stated the reason of having action-oriented responsibility as lending assistance to the ones who need, and in the way that being in cooperation is for the benefits of the society. The reason of developing the sense of altruistic responsibility takes its source from the feeling of empathy. In the dimension of national responsibility, the prospective teachers have stated that showing awareness and/or acting responsibly is required since the problems encountered all around the world will affect everyone in the world. The reason for ecological responsibility arises from the fact that clean environment is important.

Suggestions

- This study has been carried out with the prospective teachers. It can also be performed by different sample groups.
- In order that prospective teachers' awareness towards global social responsibility can be expanded, it may be suggested that academicians assign various responsibilities to the prospective teachers through the extracurricular activities, within the process of education.
- The content of the subject of Community Service Practices may be rearranged in a way to promote the development of the prospective teachers' sense of global social responsibility.
- Studies with different sample group and in different methods can be performed.
- Being a member of civil society organizations has an effect upon global responsibility. Prospective teachers may be directed to the CSOs.

References

- Akgül, U. (2010). Kurumsal sosyal sorumluluk kavramına sosyal antropolojik bir yaklaşım. *Ankara Üniversitesi Dil ve Tarih Coğrafya Fakültesi Antropoloji Dergisi*, 24, 95-114.
- Akinci Vural, Z. B. & Coşkun, G. (2011). Kurumsal sosyal sorumluluk ve etik, *Gümüşhane Üniversitesi İletişim Fakültesi İletişim Dergisi*, 1, 61-87.
- Aktepe, V. (2015). 5.Sınıf öğrencilerinin sorumluluk değerinin geliştirilmesine yönelik bir performans görevi uygulaması. *K. Ü. Kastamonu Eğitim Dergisi*, 23 (4), 1511-1534.
- Balcı, A. (2009). *Sosyal bilimlerde araştırma*. 7. Baskı, Ankara: Pegem Akademi.
- Başer, E. H. (2015). *Sosyal bilgiler öğretmen adaylarının küresel sosyal sorumluluk düzeylerinin çeşitli değişkenler açısından incelenmesi*. Yayımlanmamış Yüksek Lisans Tezi, Dumlupınar Üniversitesi Eğitim Bilimleri Enstitüsü, Kütahya.
- Başer, E. H. & Kılınç, E. (2015). Küresel sosyal sorumluluk ölçeği: Geçerlik ve güvenilirlik çalışması. *Sakarya University Journal of Education*, 5(3), 75-89
- Berkowitz, L. & Lutterman, K. G. (1968). The traditional socially responsible personality, *The Public Opinion Quarterly*, 32 (2), 169-185.
- Berman, S. (1990). Educating for social responsibility. *Educational Leadership*, 48 (3), 75-80.
- Bobo, L. (1991). Social responsibility, individualism, and redistributive policies. *Sociological Forum*, 6 (1), 71-92.
- Büyüköztürk, Ş., Kılıç Çakmak, E., Akgün, Ö. E., Karadeniz, Ş. & Demirel, F. (2012). *Bilimsel araştırma yöntemleri*. Geliştirilmiş 13. Baskı, Ankara: Pegem Akademi.

- Deveci, H. & Eryılmaz, Ö. (2016). Öğretmen adaylarının sosyal sorumluluk projesine katılımlarına ilişkin görüşleri: Let's do it! Türkiye örneği. *Uluslararası Avrasya Sosyal Bilimler Dergisi*, 7(25), 163-185.
- Deveci, H. & Eryılmaz, Ö. (2017). Sosyal bilgiler eğitiminde sosyal sorumluluk, Ed. Refik Turan, Hakan Akdağ, Sosyal bilgiler öğretiminde yeni yaklaşımlar III (96-113). Ankara: Pegem Akademi.
- Ergül, H. F. & Kurtuluş, M. (2014). Sosyal sorumluluk anlayışının geliştirilmesinde topluma hizmet uygulamaları dersine ilişkin öğretim elemanlarının görüşleri. *Elektronik Sosyal Bilimler Dergisi*, 13 (49), 221-232.
- Erol, M. & Elagöz, İ. & Şahbaz, A. (2010). Sosyal sorumluluk anlayışının işletmelerde düzeylerinin belirlenmesi üzerine bir araştırma, *Muhasebe ve Finansman Dergisi*, 46 (1), 58-65.
- Harris, A. L., Lang, M., Yates, D. ve Kruck, S. E. (2011). Incorporating ethics and social responsibility in is education. *Journal of Information Systems Education*, 22 (3):183-189.
- Kılıçoğlu, G., Karakuş, U. & Öztürk, T. (2012). Günümüz dünya sorunlarına yönelik tutum ölçeği geçerlik ve güvenilirlik çalışması. *Turkish Studies* 7 (4), 2209-2224.
- Kocadere S. A. & Seferoğlu, S. S. (2013). Toplumla hizmet uygulamaları dersinin işleniş: uygulama örnekleri ve sürece ilişkin öğrenci görüşlerinin değerlendirilmesi. *Pamukkale Üniversitesi Eğitim Fakültesi Dergisi*, 34, 75-89.
- Küçüköğlü, A., Ozan, C. & Taşkın, A. (2016). Toplumla hizmet uygulamaları dersi sürecinin yansıtıcı günlükler yoluyla incelenmesi. *İlköğretim Online*, 15(3), 787-803.
- Küçükşen K. & Budak, H. (2017). Lise öğrencilerinin sosyal değer tercihlerinin küresel sosyal sorumluluk düzeylerine etkisi. *İnsan ve Toplum Bilimleri Araştırmaları Dergisi*, 6 (3), 1813-1826.
- Nakamura, M. ve Watanabe-Muraoka, A. M. (2006). Global social responsibility: Developing a scale for senior high school students in Japan. *International Journal for the Advancement of Counselling*, 28 (3) 213- 226.
- Özen, Y. (2009). *İlköğretim 8. sınıf öğrencilerinin kişisel ve sosyal sorumluluk yordayıcılarının incelenmesi*, Yayınlanmamış Doktora Tezi, Atatürk Üniversitesi, Sosyal Bilimler Enstitüsü, Erzurum.
- Özen, Y. (2013). Sorumluluk duygusu ölçeğinin geliştirilmesi; geçerlik ve güvenilirliği. *Journal of European Education*, 3(2), 17-23.
- Patton, M. Q. (2014). Nitel araştırma ve değerlendirme yöntemleri. Mesut Bütün, Selçuk Beşir Demir (Çev. Ed.), 3. Baskıdan Çeviri, Ankara: Pegem Akademi Yayıncılık.
- Saran, M. Coşkun, G., İnal-Zorel, F. & Aksoy, Z. (2011). Üniversitelerde sosyal sorumluluk bilincinin geliştirilmesi: Ege üniversitesi topluma hizmet uygulamaları dersi üzerine bir araştırma. *Journal of Yasar University*, 22(6), 3732-3747.
- Selanik Ay, T. & Dal, S. (2014). İlköğretim öğrencilerinin yazılı anlatım ürünlerine göre sorumluluk değeri algıları. *Dicle Üniversitesi Ziya Gökalp Eğitim Fakültesi Dergisi*, 22, 78-93.
- Sezer, T. (2008). *İlköğretim 6. sınıf sosyal bilgiler dersinde sorumluluk değerinin öğretimine ilişkin öğretmen görüşleri*. Yayınlanmamış Yüksek Lisans Tezi, Gazi Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Sezer, A. & Çoban, O. (2016). Ortaokul Öğrencilerinin Sorumluluk Değeri Algıları. *Uşak Üniversitesi Eğitim Araştırmaları Dergisi*, 2(1), 22-39.
- Taylı, A. (2013). Sorumluluğun bazı değişkenler açısından değerlendirilmesi. *Muğla Sıtkı Koçman Üniversitesi, Sosyal Bilimler Enstitüsü Dergisi*, 30, 68-84.
- Toker, H. ve Tat, M. (2013). Sosyal sorumluluk: Kamu ve vakıf üniversiteleri öğrencilerinin sosyal sorumluluğa ilişkin bilgi düzeyleri ve algılarının ölçülmesi. *Selçuk Üniversitesi İletişim Fakültesi Akademik Dergisi*, 8 (1), 34-56.
- Toplumla Hizmet Uygulamaları Dersi Yönergesi, (2011). <http://www.cumhuriyet.edu.tr>
- Uğurlu, Z. & Kırıl, E. (2012). Öğretmen adaylarının topluma hizmet uygulamaları dersinin işleyiş süreci ve kazanımlarına ilişkin görüşleri. *Karabük Üniversitesi Sosyal Bilimler Enstitüsü Dergisi*, 2 (1), 59-93.
- Yazıcı, Ö. (2013). Ortaöğretim öğrencilerinin günümüz dünya sorunlarına yönelik tutumları. *Turkish Studies*, 8 (6), 807-823.
- Yeşil, R. (2014). İlköğretim okullarında görev yapan öğretmenlerin sorumluluk eğitimi stratejilerinin incelenmesi. *Hacettepe Üniversitesi Eğitim Fakültesi Dergisi*, 29 (2), 282-294.
- Yılmaz, K. (2011). Eğitim fakültelerinin sosyal sorumluluğu ve topluma hizmet uygulamaları dersi: Nitel bir araştırma. *Kuramsal Eğitimbilim*, 4 (2), 86-108.

The Impact Of Achieved Education On The Wages Of Ict Professionals In The Czech Economy

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Abstract

Information and communication technologies are one of the driving forces of advanced economies (ICT). How ICT professionals are remunerated as compared to other workers shows the importance of this industry in a certain state. This article analyzes the remuneration of ICT professionals in the Czech Republic by achieved education. For our analysis, we used data from the Labor Force Survey that contains annual information about wages and salaries in the Czech economy. We analyzed data time series, using the MS Excel platform and functionality. Based on our analysis, we have concluded that the structure of ICT professionals on the Czech market changed during the researched time period of 2000– 2007 – the group of ICT professionals with a secondary education strengthened by 10 percentage points to the detriment of the group of ICT professionals with a university education. We have also concluded that the median wage of all ICT professionals is above the median wage in the Czech Republic. We have not been able to prove a correlation between year-to-year changes in the median wage of ICT professionals and year-to-year changes in GDP.

Keywords: *Level of education, year-to-year wage increase, elementary education, secondary education, university education, GDP, ICT professionals.*

Introduction

Information and communication technologies (ICT) have become an integral part of our existence. From the very beginning in the 1950s and 1960s until the present. The dependency of entire society on ICT is critical from a technological standpoint. Information and communication technologies are practically used in all banking transactions on the global market as well as in transportation, logistics and international trade (Matejka & Vltavska, 2013). ICT also play a major role in public administration and local governments where the need for highly qualified ICT professionals keeps growing due to an ever-increasing data volume (trend big data) and the implementation of cloud computing technologies and open data concepts (Novotný, Doucek & Fischer, 2016). We can also see how ICT application in business and non-business sectors increases the competitiveness of individual regions and states (Mand'ák & Nedomova, 2014).

The relevance and importance of ICT professionals is regularly declared and presented at different economic forums and in publications, both local (Doucek, Nedomova, Maryska, 2015) and international. However, the key question is whether or not the growing wages of ICT professionals are actually in line with ICT professionals' importance for the Czech economy (Hanclova, & Doucek, 2012, Šimpach & Langhamrová 2014).

Wages in this industry, which are often higher than average wages in the rest of the economy, represent an important dimension of ICT implementation (Torrent-Sellens, 2008; Hanclova et al, 2015; Marek, Doucek, 2016). This is also a topical discussion on equality – whether or not the same work is remunerated equally, i.e. whether or not there is equality in the remuneration of ICT professionals in the Czech economy (Fischer & Vltavská 2012).

Based on our longtime research, we analyze different aspects of the impact of information and communication technologies on human society as well as on microeconomics and macroeconomics.

Problem Formulation

Our article presents the structure of ICT professionals in the Czech economy by achieved education and analyzes the median wage of ICT professionals in the Czech economy during 2000 – 2017 by achieved education. We mostly compare the trend in wages represented by median earnings. For the purposes of our research, we formulated the following research questions:

RQ1: How did the structure of ICT professionals in the Czech economy by achieved education change between 2000 and 2017?

RQ2: What is the median wage in the Czech Republic and the median wage of ICT professionals by achieved education?

RQ3: Is there a correlation between year-to-year changes in the median wage of ICT professionals and year-to-year changes in GDP?

Material And Methods (Data Collection)

The Average Earnings Quarterly Survey is harmonized with the Structure of Earnings Research of the European Union (see Commission Regulation (EC) No. 1916/2000, as amended) and provides information about the gross monthly wage (salary), hourly earnings and wage (salary) components, i.e. bonuses, extra pay and reimbursements. The gross monthly wage in our data file is a multiple of hourly earnings in the second quarter and average monthly work hours in individual years. Average work hours were rounded off. We also show the number and structure of hours worked (e.g. overtime) and not worked (e.g. sick leave and vacation). The Average Earnings Information System (AEIS) includes Regional Statistics of Labor Cost (RSLC) that provides detailed information about the difference in wages in the individual regions of the Czech Republic. The Average Earnings Quarterly Survey is sponsored by the Ministry of Labor and Social Affairs (MLSA) and managed by a commission comprising of the representatives of the MLSA, the Czech Statistical Office (CSO), the Ministry of Finance, the Czech National Bank, the Czech-Moravian Confederation of Trade Unions, The Union of Industry and Transportation of the Czech Republic, the Center for Economic Research and Graduate Education of Charles University and the Economics Institute of the Czech Academy of Sciences (CERGE EI), the University of Economics in Prague and other institutions. The AEIS is prepared by TREXIMA.

For our research, we classified ICT professionals in the Czech economy in accordance with the CZ-ISCO methodology (ISCO, 2015) that divides ICT professionals into the following three main groups (CZSO, 2014):

- ICT managers (CZ-ISCO 133);
- ICT specialists (CZ-ISCO 25);
- ICT technicians (CZ-ISCO 35).

The wages during the researched time period are shown as the median instead of the average. The median represents the middle of all identified wages, i.e. 50% of employees have higher earnings than the median and 50% of employees have lower earnings than the median. The median is usually a better indicator of earnings than the average because it is not affected by extreme earnings and it directly shows the earnings of the “middle employee.”

Our data were processed, using mainly MS Excel and also big data processing tools, which in our case was Microsoft SQL Server and SPSS statistics software.

GENERAL DATA CHARACTERISTICS

Our analyses always work with data for the second quarter of the relevant year because such data are more stable than data for other quarters. The size of the analyzed sample of ICT professionals gradually increased from over 8,000 in 2000 to over 50,000 in 2017. The size of the analyzed sample concerning the entire Czech Republic increased from the original one million to over two million.

RESULTS AND DISCUSSION

The analyzed data were processed in MS Excel to obtain answers to our research questions.

RQ1: How did the structure of ICT professionals in the Czech economy by achieved education change between 2000 and 2017?

The trend in the structure of ICT professionals in the Czech economy from 2000 to 2017 is shown in [Figure 1].

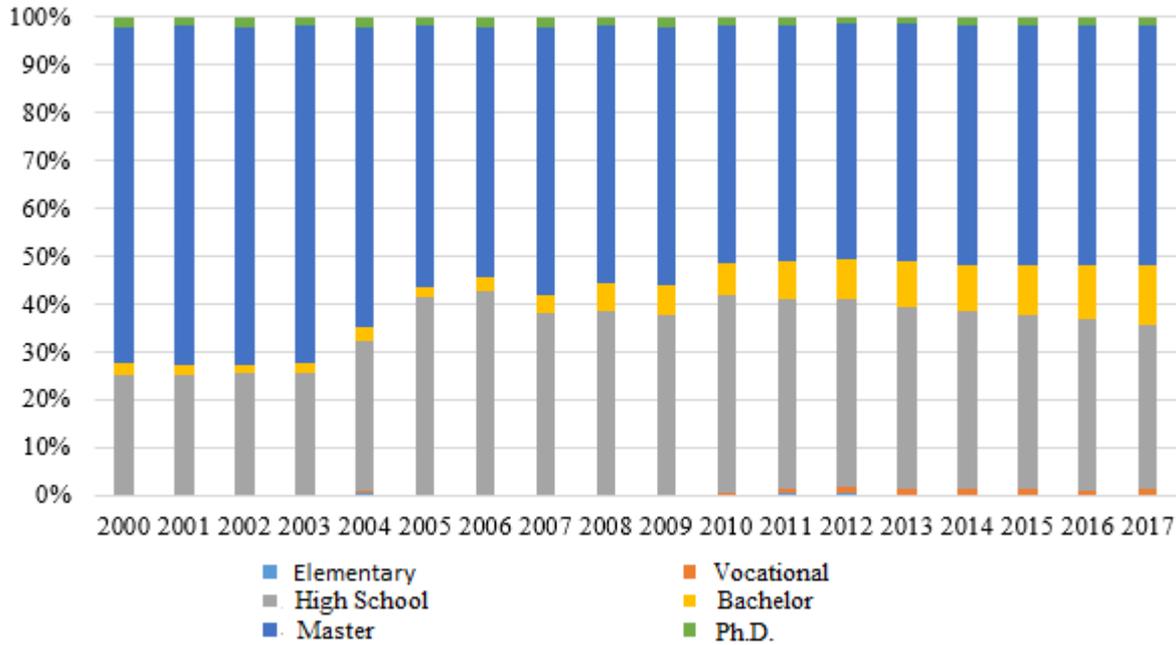


Figure 1: The structure of ICT professionals in the Czech economy by achieved education (Source: authors. Data Trexima)

The data in [Figure 1] show that an elementary and vocational education is not practically represented. The percentage of ICT professionals with an elementary education is very insignificant. During the research time period, we identified ICT professionals only during three years and their percentage did not exceed 0.50%. The percentage of ICT professionals with a vocational education is small – 1.00% in 2011 and 1.09% in 2017. It means about one percentage point. The percentage of ICT professionals with a complete secondary education during the researched time period kept growing – from 25.17% in 2000 to 34.44% in 2017. The percentage of ICT professionals with a bachelor’s degree went up during the researched time period from 2.57% in 2000 to 12.49% in 2017. The percentage of ICT professionals with a master’s degree is the highest – 70.20% in 2000 and 50.27% in 2017. This decreasing trend is the result of a new perception of ICT professions. Contrary to the past, these professions now require only a secondary education. The percentage of ICT professionals with a Ph.D. degree was 2.07% in 2000 and 1.71% in 2017.

Overall, the percentage of ICT professionals with a university education dropped during the researched time period (74.83% in 2000 and 64.47% in 2017). On the other hand, the percentage of ICT professionals with a secondary education went up (25.17% in 2000 and 35.53% in 2017). It is important to point out that the absolute number of ICT professionals keeps growing. Therefore, even though there was a relative decrease in the percentage of ICT professionals e.g. with the highest education (Ph.D.), their absolute number went up.

RQ2: What is the median wage in the Czech Republic and the median wage of ICT professionals by achieved education?

In order to compare the median wage for each education level of ICT professionals with the median wage in the Czech Republic, we had to include in the chart the median wage in the Czech Republic. The chart shows the share of each level of education on the median wage in the Czech Republic. Therefore, if the chart shows that the level of education is 40% in positive numbers, it means that the median wage in this level of education is a 1.4 multiple of the median wage in the Czech Republic. These relations are shown in [Figure 2], where the median represents 0 on the Y axis.

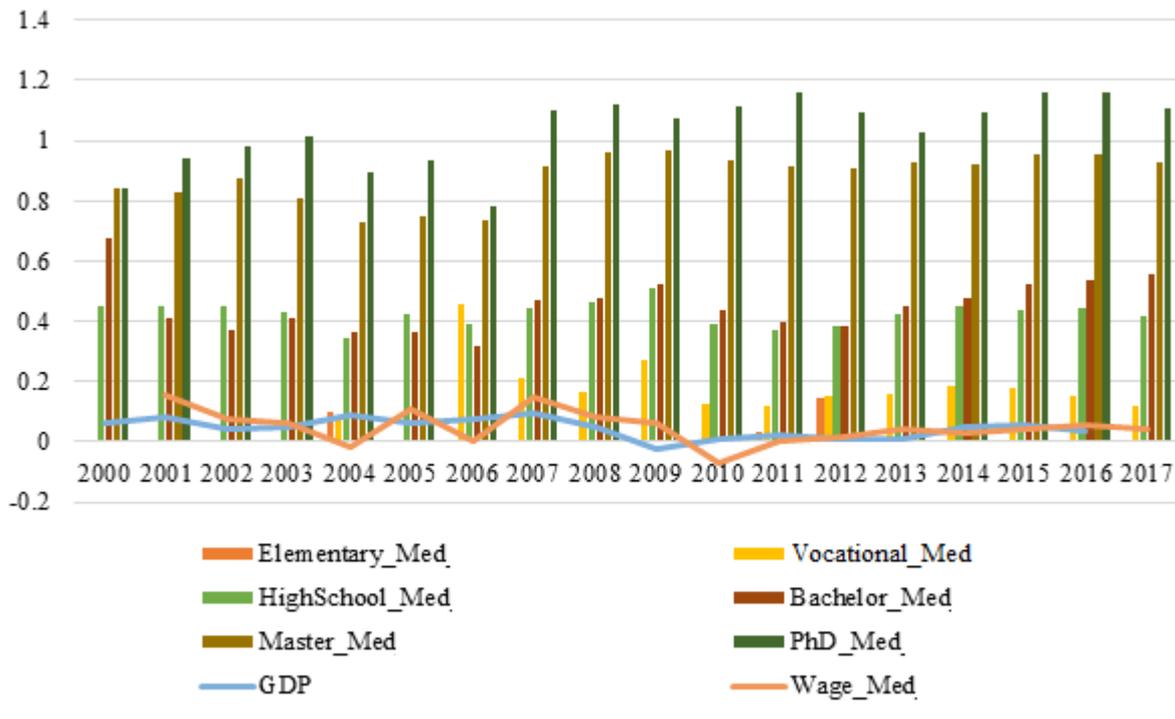


Figure 2: The trend in the median wage of ICT professionals during 2000 – 2017 by achieved education and its comparison with the median wage in the Czech Republic (Source: authors. Data Trexima)

For a better comparison of the trend over time and the trend in the entire economy, the chart also shows year-to-year changes in GDP and year-to-year changes in the median wage of ICT professionals. [Figure 2] shows that the median wage for practically all levels of education of ICT professionals is above the median wage in the Czech Republic and that the median wage of ICT professionals with a university education (a master’s degree and Ph.D. degree) went up considerably between 2006 and 2007.

The median wage of ICT professionals with a vocational education during the researched time period was on average a 1.27 multiple of the median wage in the Czech Republic. The median wage of ICT professionals with a complete secondary education was on average a 1.40 multiple of the median wage in the Czech Republic. The median wage of ICT professionals with a bachelor’s degree was similar to that of the ICT professionals with a complete secondary education but was quickly going up during the past five years of the researched time period. [Figure 2] shows that the median wage of ICT professionals with a bachelor’s degree was 1.42 times higher than the median wage in the Czech Republic mainly thanks to the last six years of the researched time period. The median wage of ICT professionals with a master’s degree was 1.79 higher and the median wage of ICT professionals with a Ph.D. degree was even 1.88 times higher than the median wage in the Czech Republic.

The medians of all levels of education of ICT professionals basically represent an increase in the multiple of the median wage in the Czech Republic in the long run. In particular, in the case of ICT professionals with a master’s degree and Ph.D. degree.

RQ3: Is there a correlation between year-to-year changes in the median wage of ICT professionals and year-to-year changes in GDP?

To answer this question, we also analyzed the GDP in the Czech Republic. The data are provided in [Figure 3].

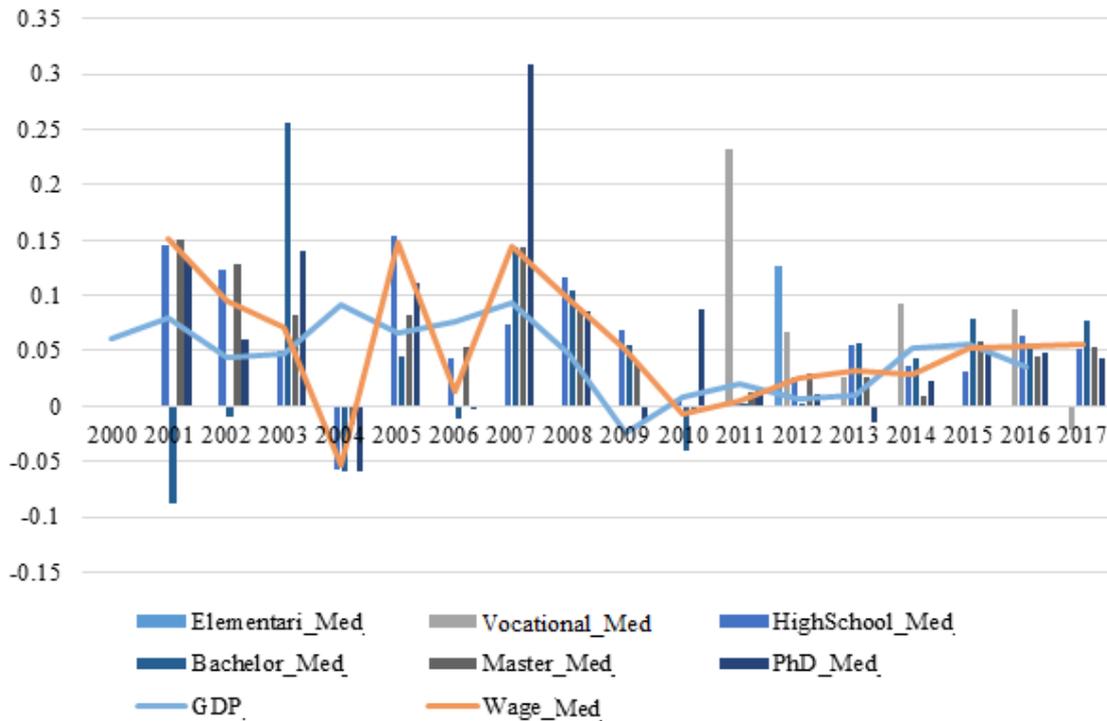


Figure 3: Year-to-year changes in the wage of ICT professionals in the Czech Republic during 2000 - 2017 by achieved education (Source: authors. Data Trexima)

[Figure 3] shows a big disarray in annual increments of median wages. A big fluctuation in individual years for different levels of education indicates an acute shortage of ICT professionals of certain professions (ICT technicians – e.g. in 2003, 2011, 2014, 2015 and 2016 and ICT specialists in 2003 and 2007) during certain periods of time. Starting in 2015, year-to-year increments were relatively stable, and ICT professionals with a lower level of education show the highest year-to-year increment.

After having verified the assumptions, we used a correlation analysis to identify a correlation between the trend in the wage of ICT professionals (regardless of their achieved education) and the trend in GDP. The correlation coefficient for relations in the current year was 0.3776. We were unable to prove any statistically significant correlation between year-to-year changes in the GDP of the Czech Republic and year-to-year changes in the median wage of ICT professionals.

Conclusion

The overall conclusions of our analysis are as follows:

RQ1: How did the structure of ICT professionals in the Czech economy by achieved education change between 2000 and 2017?

- The percentage of ICT professionals with an elementary education is very insignificant.
- The percentage of ICT professionals with a secondary education in the Czech Republic during the researched time period went up from 25.17% in 2000 to 35.53% in 2017.
- The percentage of ICT professionals with a university education (a bachelor’s degree, master’s degree and Ph.D. degree) during the researched time period went down from 74.83% in 2000 to 64.47% in 2017.

Due to changes in the classification of ICT professions in the Czech Republic, we can expect that the percentage of ICT professionals with a complete secondary education and a bachelor’s degree will go up because many ICT professions that used to require a master’s degree were reclassified to a bachelor’s degree or even a secondary education.

RQ2: What is the median wage in the Czech Republic and the median wage of ICT professionals by achieved education?

- The median wage for all levels of education of ICT professionals was above the median wage in the Czech Republic.

- The ratio between the median wage in the Czech Republic and the median of the level of education regularly increased during the past six years only in the case of ICT professionals with a bachelor's degree; other levels of education oscillate around the average multiple of the median wage of the Czech Republic.
- Average multiples of the median wage in the Czech Republic for the median wage of ICT professionals by achieved education are provided in [Table 1].

Table 1: A comparison of the median wage by achieved education and the median wage in the Czech Republic

Level of education	Multiple of the median wage in the Czech Republic
Vocational	1.27
Complete secondary	1.40
Bachelor	1.42
Master	1.79
Ph.D.	1.88

RQ3: Is there a correlation between year-to-year changes in the median wage of ICT professionals and year-to-year changes in GDP?

We were unable to prove this correlation. After having verified the assumptions for a correlation analysis, we calculated a correlation coefficient of 0.378, which is a very weak correlation.

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References

CZSO. (2014). *IT odborníci*. Retrieved from https://www.czso.cz/csu/czso/lidske_zdroje_v_informacni_spolecnosti_it_odbornici

Doucek, P., Nedomová, L., & Maryška, M. (2015). Is it attractive to be the ICT professional in the Czech economy? In *IDIMT 2015 - Information Technology and Society - Interaction and Interdependence* (pp.73-87). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-395-2

Fischer, J., & Vltavská, K. (2012). Intermediate Consumption of ICT Products and Its Impact on Economy of the Czech Industries. In *IDIMT-2012 - ICT Support for Complex Systems* (pp.115-121). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-022-7

Hanclová, J., & Doucek, P. (2012). The impact of ICT capital on labor productivity development in the sectors of the czech economy. In *IDIMT 2012 - ICT Support for Complex Systems* (pp.123-133). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-022-7

Hanclova, J., Doucek, P., Fischer, J., & Vltavska, K. (2015). Does ICT capital affect economic growth in the EU-15 and EU-12 countries? *Journal of Business Economics and Management*, 16(2), 387-406. doi:10.3846/16111699.2012.754375

ISCO. (2018). *Klasifikace zaměstnání (CZ-ISCO)*. Retrieved from <https://www.czso.cz/csu/czso/klasifikace-zamestnani-cz-isco-n-f4yhpe3xt8>

Mand'ák, J., & Nedomova, L. (2014). Measuring Performance of European ICT Sectors Using Output-Oriented DEA Models. In *IDIMT-2014 - Networking Societies – Cooperation and Conflict* (pp.79–86). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-340-2

Marek, L., & Doucek, P. (2016). Vývoj mezd a příjmové nerovnosti u ict odborníků v české republice. *Politická Ekonomie*, 64(8), 922-938. doi:10.18267/j.polek.1118

Matejka, M., & Vltavska, K. (2013). The Czech Wage Distribution in the Context of ICT Sector. In *IDIMT-2013 - Information Technology Human Values, Innovation and Economy* (pp. 63–70). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-083-8

Novotný, O., Doucek, P., & Fischer, J. (2016). ICT and its Impact on Economy and Society – Quest For Data. In *IDIMT-2016 - Information Technology, Society and Economy Strategic Cross-Influences* (pp. 15–20). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-869-8

Šimpach, O., & Langhamrová, J. (2014). The Impact of ICT Growth on Households and Municipalities in the Czech Nuts-3 Regions: The Application of Cluster Analysis. In *IDIMT-2014 - Networking Societies - Cooperation and Conflict* (pp. 63-70). Linz: Trauner Verlag Universitet. ISBN 978-3-99033-340-2

Torrent-Sellens, J. (ed.). (2008). *La empresa red: tecnologías de la información y la comunicación, productividad y competitividad*. Madrid: Ariel, 2008. ISBN 978 84 344 4277 1.

The Influence of a Concept Mapping-Based Exam on Students' Exam Performance

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Absrtact

The aim of the study was to explore the effect of Concept Mapping (CM) exam on students' retention and students' exam performance. Two sets of exams were developed: a regular format exam and a Concept Mapping-Based Exam. The Concept Mapping-Based Exam contained a blank concept maps similar to the ones in the 7th-grade student's science book. Both exams have the same number of questions. Seventy students from grade 7th at Al-Arqam Ibn-Abil-Arqam School, one of the Basic Education schools in Oman, were the sample of the study and were taught two units from the 7th-grade students' science book by the regular teaching method and by the same teacher. Thirty students participated in taking the exam, 16 were to do the regular exam and 16 were to do the Concept Mapping-Based Exam. The exams were distributed to them randomly. The study showed that the students who took the Concept Mapping-Based Exam outscored those who took the regular one. It is interesting that the study showed there was a positive correlation between recalling information and the presence of Concept Maps in the 7th-grade student's science book as the exams showed.

Introduction

Teachers need to know how their students learn to help them excel in their learning. In other words, it is important for teachers to know how students process, store and retrieve information. Some teachers teach students without having much formal knowledge of how students learn (Fry, Ketteridge, & Marshall, 2009). Therefore, teachers need to use techniques/approaches to help students learn information more effectively.

There are no simple answers to the questions 'how do learners learn?' and 'how teachers bring about learning?' The knowledge about the relationship between teaching and learning is still incomplete, but teachers do not know enough about learning to be able to make some firm statements about types of action that will usually be helpful in enabling learning to happen (Fry, Ketteridge, & Marshall, 2009).

Some literature shows that students learn through organizing the new information in a certain schema. Schema is the map about a certain topic or theme that helps the learners to put new information into a meaningful context (Anderson, 1984, p. 5). To do this, learners have to activate their schemata to interpret the texts and to make sense and this is called the schema theory which "focuses on the role of the individual in the comprehension process and how background knowledge and interests influence the reader' interpretation" (Omaggio,1993).

Ausubel states that "as a result of this type of anchorage to cognitive structure, the newly-learned material is no longer dependent for its incorporation and retention on the frail human capacity for assimilating and retaining arbitrary associations" (Ausubel, 1967: 20). Morton (2018) maintains that "Concept mapping tools allow you or your students to visually depict a system of relationships by creating a map in which nodes represent ideas or facts, and lines or connectors between nodes represent relationships". This came along with the Schema Theory which suggests that learners take new information and stores it in pre-existing hierarchies or channels (Dye, 2000) and reduce the amount of incoming information through deleting the unimportant ones, they will easily store the information into their long term memory instead of the working memory and then they can remember them quickly (Sweller, 1988).

Vanides, Yin, Tomita, & Ruiz-Primo (2005) maintain that the teachers can have insights into how learners organize and represent knowledge when their students create Concepts Maps.

The Concept Maps can be also used as a tool to assess students' learning. Tuan & Thuan (2011) argue that Concept Mapping has been proven to be a powerful instructional tool which assists teachers to assess learners' understanding and make connections between concepts explicitly. Ruiz-Primo (2004) maintains that the use of Concept Maps to evaluate student declarative knowledge structure is appealing. A student's map directly reflects, to some degree, a student's understanding in a domain; there is a potential in using concept maps as assessment instruments.

Varghese (2009) views the use of Concept Map as an effective way of looking at what is inside the learner's mind and reveals a conceptual understanding that is not generally identifiable by other assessment tools such as written tests.

This can be a useful strategy for assessing the knowledge learners have before engaging in further learning or a new program or course (Hay, Kinchin & Baker, 2008).

The Significance Of The Study

In Oman Government schools, students' learning assessment is based on the traditional test. The items in the traditional test can be written in various formats such as multiple choice, matching, true/false, short answer, and essay. Some of these tests require students to memorize knowledge. The aim of this study is to explore the effectiveness of using Concepts Maps as an assessment tool for students' performance. Approving effectiveness, teachers can use Concept Maps as tools to assess their students' performance, helping to recall information easily in the process they learned information.

The Study Questions And Hypothesis

What impact does Concept Maps have over students' retention?

Is there any significant difference in the performance of students taking Concept Maps exam and of those taking normal exam?

Context Of The Study

The Government schools in Oman underwent an educational reform in 1998 and the Ministry of Education introduced a new schooling system called "Basic Education system" in the academic year 1999-1998 (Al-Issa & Al-Bulushi, 2012). The new system consisted of 10 years of Basic Education (Grades 1 to 10) and 2 years of Post-Basic Education (Grades 11 and 12). The Basic Education has two cycles which are Cycle 1, consisting of grades 1- 4, and Cycle 2, containing grades from 5 to 10 (Al-Jardani, 2014). The current study was conducted in one of the male schools in Cycle 2 (Al-Arqam Ibn-Abil-Arqam School) and specifically in grade 7 in the science subject. The science book consisted of five units and this study utilized unit 4 as it is the most suitable unit to perform the experiment and it is convenient to employ the Concept Mapping format for the assessment. The unit is entitled "Changes in the Earth Crust" and it contained five lessons. The teacher taught this unit for two weeks.

Study Design And Instrumentation

The study took place in semester two of the academic year 2017-2018. Before conducting the study, the researchers chose one class randomly and they divided the class into two groups randomly; the control group and the experimental group consisted of 16 students each. To check the homogeneity of the two groups, the researchers looked at the scores of the students in four tests taken previously. Table 1 and Table 2 show the students' scores in these tests.

Table 1 Shows the Students' Scores in These Tests

Group	Quiz1	Quiz2	Quiz3	Mean	Group	Quiz1	Quiz2	Quiz3	Mean
Control	8	4	5	13.7	experimental	4.5	8	7.5	15.0
Control	2	7	7	11.3	experimental	4	5	6	11.0
Control	6.5	4	7	12.8	experimental	3.5	10	8	16.2
Control	7	8	7	17.3	experimental	5	6	8	13.7
Control	3.5	5	6	10.5	experimental	7	10	7.5	19.5
Control	6.5	6	6	14.5	experimental	9	5	9	17.0
Control	9	10	10	22.3	experimental	10	9	10	22.3
Control	9	7	8.5	18.8	experimental	5.5	4	6.5	11.7
Control	2	5	7.5	9.5	experimental	7	8	8	17.7
Control	4	2	5	7.7	experimental	6	9	7	17.3
Control	10	8	7.5	20.5	experimental	10	10	8	22.7
Control	8	7	9.5	18.2	experimental	6	6	4.5	13.5
Control	8	6	5.5	15.8	experimental	8	9	5	18.7
Control	5.5	3	7.5	11.0	experimental	10	8	8	20.7
Control	5.5	6	6	13.5	experimental	8	9	10	20.3
Control	7	5	6	14.0	experimental	3	1	10	7.3

Table 2 Summarizes the Result

Group	Mean	N	Std. Deviation
Control	6.344	16	2.4408
Experiential	6.656	16	2.3503

Table 3 shows the results of the tests indicating that there is no statistical difference between the two groups, thus, the two groups are homogeneous and equivalent for the purpose of conducting the study.

Table 3 Means and Stander Deviation for Groups Homogeneous Exam Results

	Groups	N	Mean	Std. Deviation	T	Sig
Quiz One	Control	16	6.344	2.4408	-.369	
	Experimental	16	6.656	2.3503	-.369	0.959
Quiz Two	Control	16	5.813	2.0402	-1.826	
	Experimental	16	7.313	2.5747	-1.826	0.263
Quiz Three	Control	16	6.938	1.4705	-1.361	0.787
	Experimental	16	7.688	1.6419	-1.361	

Measure

The teacher designed two tests that measured the knowledge which students learned in unit four. The two tests consisted of five questions, however, the first test assessed the conceptual knowledge in that unit in a normal way (as tables and points) for the control group and the second test assessed the same information using concept mapping format for the experimental group. After finishing teaching unit four, the researchers administered the two tests for the experimental group and the control group. Figure 1 shows an example of question 3 for the control group and Figure (1) illustrates an example of the same question for the experimental group.

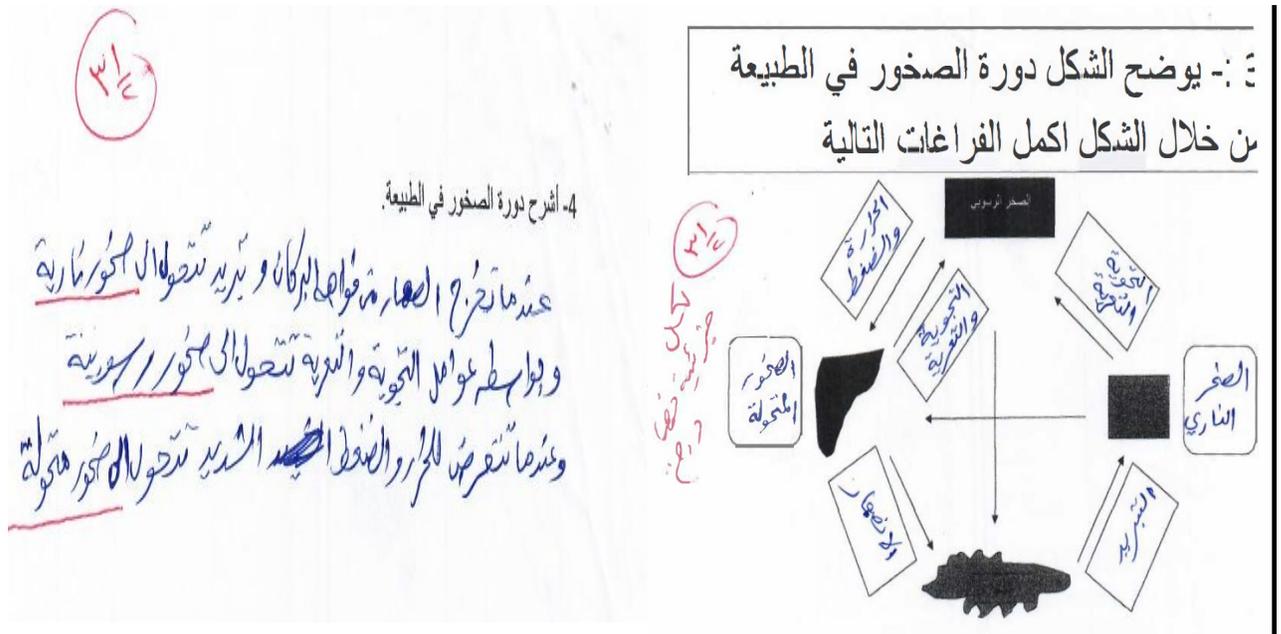


Figure 1. Sample of Question (4) for the Control Group and Question (2) for Concept Map Exam.

Results

Table 4 shows that the experimental group outperformed the control group in all five questions of the test. Furthermore, the overall scores of the experimental group are higher than the control group indicating that the Concept-Mapping format has a positive effect on students' performance in the test.

Table 4 Descriptive Statistics for Students' Exam Performance

	Group	N	Mean	Std. Deviation
Q1	Control	16	2.625	2.1794
	Experimental	16	2.156	1.9555
Q2	Control	16	.000	.0000
	Experimental	16	3.063	2.6700
Q3	Control	16	.625	1.2450
	Experimental	16	1.969	1.4079
Q4	Control	16	.250	.5774
	Experimental	16	1.125	.8466
Q5	Control	16	.813	1.7970
	Experimental	16	.938	2.0484
Overall	Control	16	.8625	.72560
	Experimental	16	1.8500	1.37695

Moreover, Table 5 indicates that there is a significant difference between the control group and the experimental group in favour of the experimental group in the overall score.

Table 5 Independent T-Test for the Control Group and the Experimental Group

	Group	N	Mean	Std. Deviation	F	Sig.
Overall	Control	16	.8625	.8625		
	Experimental	16	1.850	1.8500	7.066	.017

However, looking at each question separately, it is noticeable that questions 2, 3, and 4 obtained a statistical difference, though there was no statistical difference in questions 1 and 5.

Table 6 The Independent T-Test for the Two Groups in Exam 5 Questions

	T	df	Sig.	Mean Difference
Question#1	.640	30	.527	.4688
Question#2	-4.588	30	.000	-3.0625
Question#3	-2.860	30	.008	-1.3438
Question#4	-3.416	30	.002	-.8750
Question#5	-.183	30	.856	-.1250

The researchers contributed the result of no significant difference for question one and question five to the visual clues given in the two questions; the two questions in a traditional format contain tables which might help the students to recall the required information to answer the questions as shown in the figures below.

6-ما المقصود بكلام من هذه الأنواع من أنواع التجوية:
 ب- التجوية الميكانيكية: هي السابجة عند القوة المباشرة للصخور
 ج- التجوية الكيميائية: هي السابجة عند تفاعل الصخور مع المواد الكيميائية في البيئة
 د- التجوية الحيوية: هي عبارة عن التغير فيزيائي أو الكيميائي للصخور التي تسبب فيه بعض الكائنات الحية.
 7- أذكر أمثلة على أنواع التجوية في الجدول التالي:

حيوية	كيميائية	ميكانيكية
سقوط الصخور من الجبل الجبلي	الحجر الجيري	الخرق والتمزق

1- عدد طبقات التركيب الكيميائي للأرض:
 1- القشرة الأرضية
 2- الوشاح
 3- اللب
 2- قارن في جدول بين طبقات التركيب الكيميائي للأرض:
 من حيث المفهوم، أمثلة، نسبتها من الكرة الأرضية، السمك أو نصف القطر.

نوع الطبقة	مفهومها	أمثلة عليها	نسبتها من الكرة الأرضية	السمك أو نصف القطر
القشرة الأرضية	هي الطبقة الخارجية للكرة الأرضية التي تقع فوق قشرة الوشاح	الركنيت، السيليكات، الأوكسجين، الهيدروجين	0.5 %	بين 5 Km و 80 Km
الوشاح	هي الطبقة الواقعة بين القشرة واللب	الغبار، السيليكات، المغنيسيوم، الحديد، النيكل	66.5 %	2900 Km
اللب	هو الطبقة التي تتخذ من أسفل الوشاح من وصولها إلى مركز الأرض	الحديد، النيكل	33 %	3430 Km

Figure 2. Question #1 and Question #2 in the traditional format

Furthermore, it is interesting to notice that the scores of the students higher for the information which is presented in maps concept (in the Ninth science book). For examples, the concept map in question two is similar to the concept map and the concept map in question three is similar to the concept map in the student's textbook: mean=3.063 and mean=1.85; see Figure (3) and Figure (4).

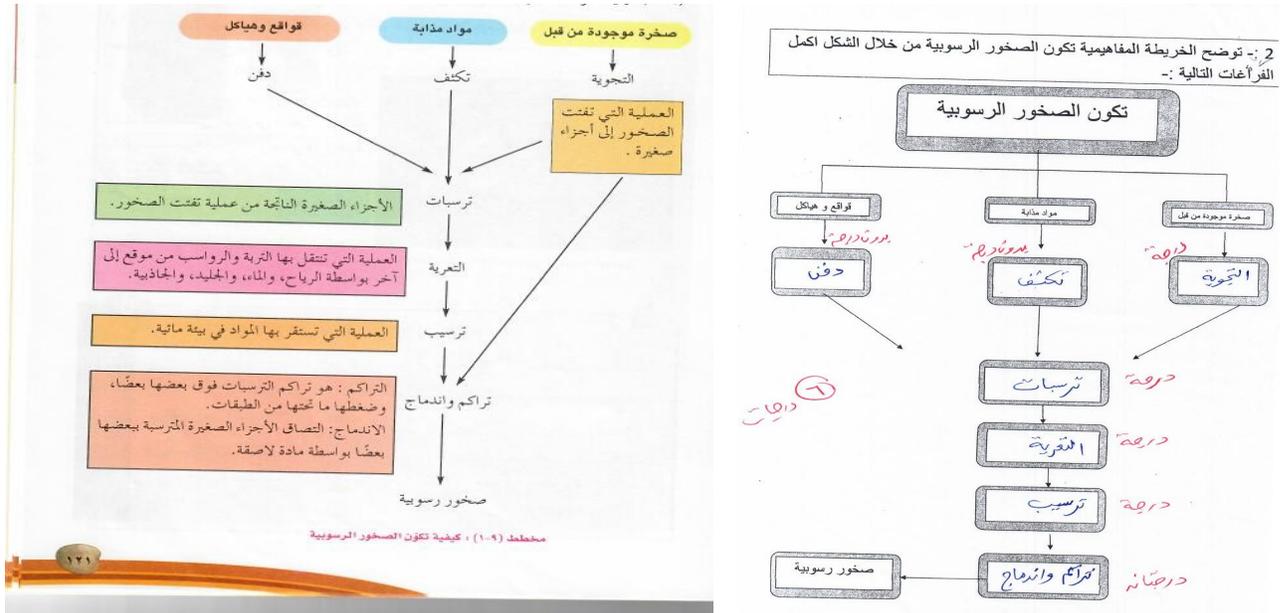


Figure 3. Page (121) from Student's Textbook and Question (2) from Concept Map Exam

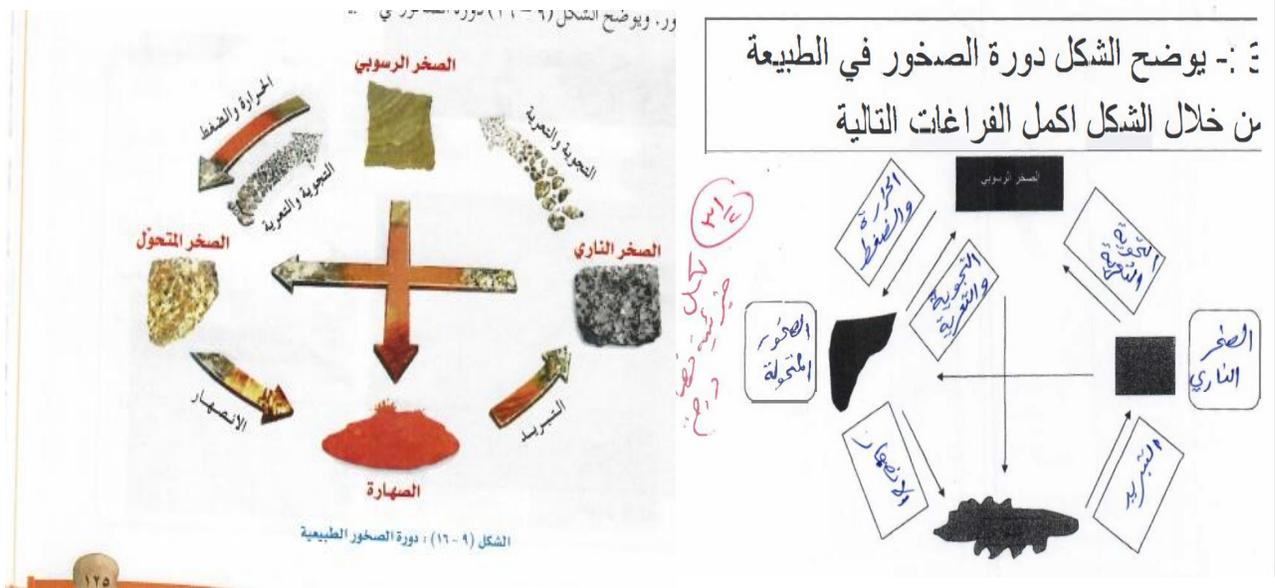


Figure 4. Page (125) from Student's Textbook and Question (3) from Concept Map Exam

Conclusion

Generally speaking, the study reveals the importance of Concept Maps in drawing a conclusion about how students learn, store and retrieve information. The study shows a positive impact of using Concept Maps in exams; the students who took the exam which contained Concept Maps scored higher than their counterparts; Also, the researchers found out the scores of the students higher for the information which is presented in Maps Concept (in the Ninth science book). Therefore, it is safe to say, that teachers can incorporate Concepts Maps in their exams to help their students retrieve the learned information effectively.

References

- Al-Issa, A. S., & Al-Bulushi, A. H. (2012). English language teaching reform in Sultanate of Oman: The case of theory and practice disparity. *Educational research for policy and practice*, 11(2), 141-176.
- Al-Jardani, K. S. (2014). The need for a study into stakeholders needs and expectations of schools graduates English language level and skills for entry into the tertiary education level in the Sultanate of Oman. *International Journal of English Language and Literature Studies*, 3(4), 350-355.
- Anderson, R. C. (1984). Some reflections on the acquisition of knowledge. *Educational Researcher*, 13(10), 510.
- Dye, G. (2002). Graphic Organizers to the rescue! Helping students link and remember information. *Teaching Exceptional Children*, 32, 72-76.
- Fry, H., Ketteridge, S., & Marshall, S. (2009). *A Handbook for Learning and Teaching in Higher Education: Enhancing Academic Practice* (3rd ed.). London: Routledge
- Morton K., (2018). Concept Mapping Tools. Centre for Teaching Excellence, University of Waterloo. Retrieved on August 1st, 2018 from: <https://uwaterloo.ca/centre-for-teaching-excellence/teaching-resources/teaching-tips/educational-technologies/all/concept-mapping-tools>.
- Omaggio, A. (1993). *Teaching language in context*. Boston: Heinle & Heinle.
- Ruiz-Primo, M. A. (2004) Examining Concept Maps as an assessment Tool. In A. J. Cañas, J. D. Novak & F. M. González (Eds.), *Concept Maps: Theory, Methodology, Technology. Proceedings of the First International Conference on Concept Mapping*. (Vol. I). Pamplona, Spain: Universidad Pública de Navarra.
- Sweller, J. (1988). Cognitive load during problem solving: Effects on learning. *Cognitive Science*, 12, 257-285.

The Leadership Styles and Supervisory Competence of Master Teachers in Selected Schools in the National Capital Region as Base Reference for Competency Upgrading

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Introduction

Leadership indulged through leaders fractioned the influence of people's morale towards the organizations and its constituents. Accomplishing school endeavours was in great need of head teachers that were holistic in all aspect of leading his subordinates and his organization.

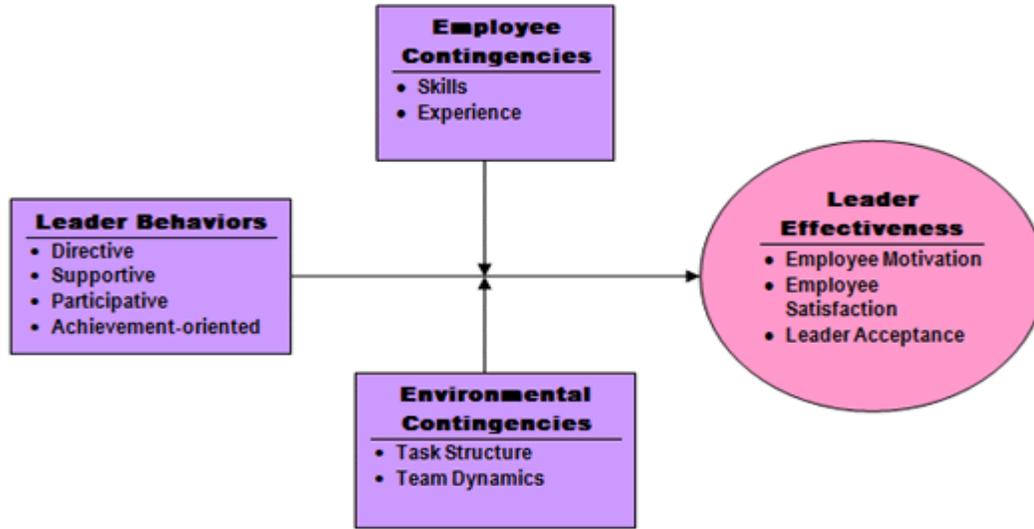
However, leader in today's environment of management who is not in an advocating change has many external environmental forces, such as economics, technology and even governmental regulations are affected in profound impact on such environment. With few resources, workers have realized that they must do more with less; they understand that jobs need to be restructured and new management systems need to be developed. They also know that if an organization is going to be efficient and effective, the work force must maximize to the fullest. Moreover, leaders' motivation towards school environment is one of the elemental notions that could largely influence their sentiments towards the institution. It's unimaginable to lead people and if teachers do not even have basic competence and feel threatened because of their lack of preparation for it.

One of the priorities of heads of school is to monitor the teaching learning process in their schools. Monitoring involves actions envisaged by the head to ensure that things are going according to the objectives set at different levels and at different points in time and also to see to it that things are revolving according to plan and in line with the target set. The purpose of monitoring is, as such, to increase efficiency and improve effectiveness of the system in place. Since teachers and heads are input variables in a school, the head, as an instructional leader must support and facilitate any initiative conceived by teachers.

Theoretical Framework

This presents related theories and concepts that will help the researcher create a clearer a picture to the research.

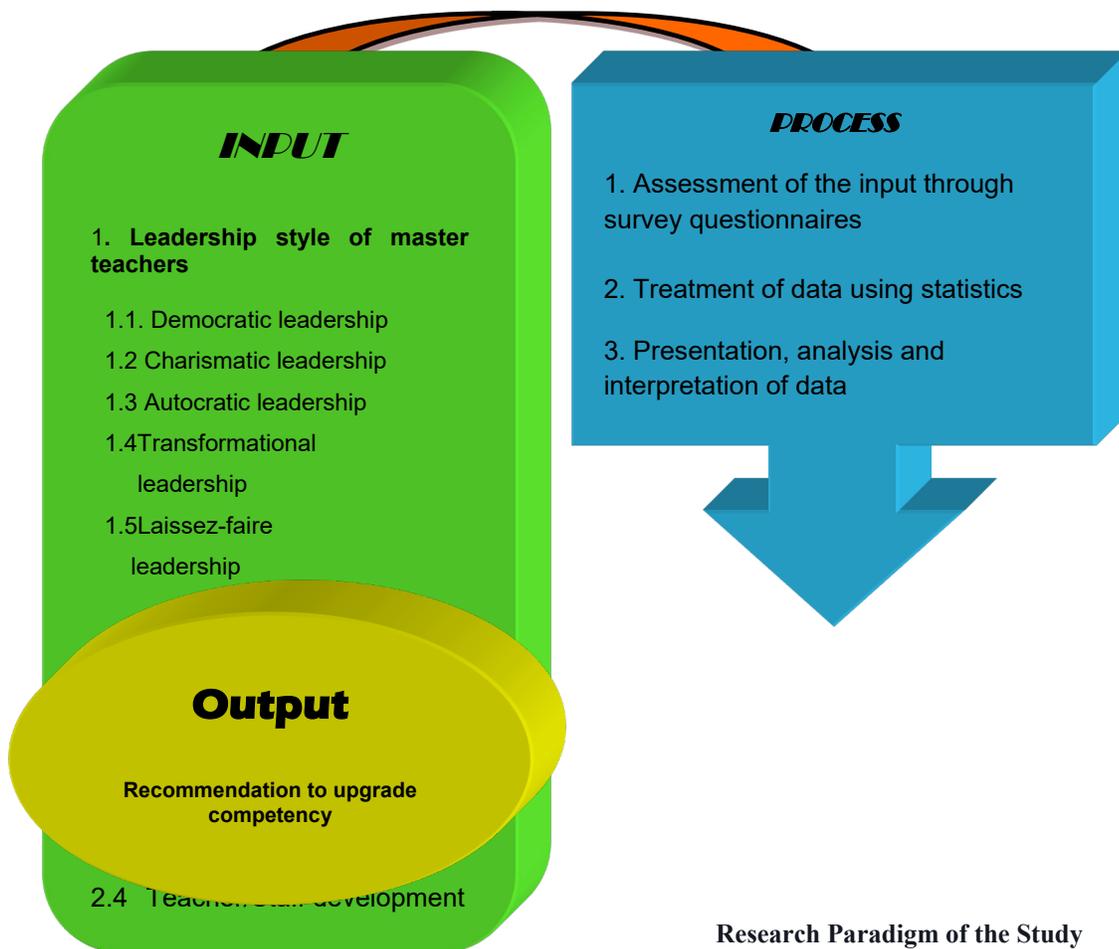
The path-goal theory of leadership, this theory states leader's behavior is important for good performance as a function of its impact on subordinates' perceptions of paths to goals and the attractiveness of the goals. When leader behavior clarifies these goals or makes them more attractive the satisfaction, performance, and the leader acceptance is expected to increase. The specific relationship between leader behavior and these criteria will depend upon the personality of the subordinate and the existing task environment.



Path-goal Paradigm theory
Figure 2

Conceptual Framework

The research is guided by Path Goal Theory and researcher conceptualized an Input-Process-Output system which served as the direction of the research and it is represented in figure 2.



Research Paradigm of the Study
Figure 6

Figure 5 shows the relationship among the I- P- O system of the research study. The system starts with the INPUT which contains the data obtained from the Leadership style of master teachers; democratic leadership, charismatic leadership, autocratic leadership, transformational leadership, laissez-faire Leadership; And Supervisory function of head teachers, instructional supervision, school improvement, pupil's development; and teacher/Staff development. The PROCESS shows how the input will be processed through survey questionnaires. The data that will be gathered will be treated using statistics for presentation, analysis and interpretation of data. Lastly, the OUTPUT shows the end result of the study which are the interventions to upgrade the teacher's level of competence.

Statement of the Problem

This study aimed to determine the leadership styles and supervisory competence of master Teachers in National Capital Region as Base Reference for Competency Upgrading.

Specifically, it sought to answer the following questions.

1. What leadership styles are embraced by the master teachers?
 - 1.1 Democratic leadership;
 - 1.2 Charismatic leadership;
 - 1.3 Autocratic leadership;
 - 1.4 Transformational leadership; and
 - 1.5 Laissez-faire leadership
2. What is the level of competence of the respondents in the performance of their supervisory functions in the area of:
 - 2.1 Instructional supervision
 - 2.2 School improvement
 - 2.3 Pupils development; and
 - 2.4 Teacher/Staff development
3. Do the leadership styles of the master teachers significantly affect their level of competence in performing their supervisory functions?
4. Based on the findings of the study, what could be recommended to upgrade the competency of teachers?

Hypothesis

The leadership styles of the head teachers do not significantly affect their level of competence in performing supervisory competence.

Significance of the Study

The study aimed to contribute empirical data on the issues of Leadership styles and supervisory competence of master Teachers in Division of Taguig City and Pateros: Base reference competency upgrading.

The result of this study would be beneficial to the following:

Department of Education (DepEd). It helps particularly the secondary education would be provided with the prevailing leadership styles or practices which could serve as basis understanding the dynamics or performance. Likewise it would improve the scope of in-service preparations programmes for head teachers to enhance efficient and effective leadership style.

Principals .It helps them to pre-examine and appraise their own leadership and make adjustments where necessary. They may also realize their leadership styles may vary depending on who they are dealing with and the situation they are in.

Head Teachers. It helps in formulating techniques and styles of leading the group and manage his/her works in the field of his/her skills and potentials on leadership and management to enhance the effectiveness and efficiency of his or her teachers.

Teachers. It may utilize the results of this study to participate actively in the decision making process in term of curriculum, planning, improvement of subject instructional materials and enhance their teaching performance.

Students. They will receive quality education will greatly benefit from the study and may lead other people in the most and better way styles and able learn the good value of without looking for any return.

Future Researchers. They will use to guide for them who may be interested to conduct other related studies about head teachers leadership styles.

Scope and Limitation of the Study

The study is concentrated in public secondary school master teachers from 14 schools in National Capital Region . The study primarily focused on determining the leadership styles such as democratic leadership, laissez-faire leadership, autocratic leadership, transformational leadership, charismatic leadership. And focuses also on level of competence of master teachers in their supervisory functions in terms of; instructional supervision, school improvement, pupils development; and teacher/staff development.

Findings

Organized according to the specific questions in the statement of the problem, the following were the findings of the study.

1. Leadership styles are embraced by the master teachers.

The respondents' Leadership styles embraced by the head teachers. Data shows that head teachers have transformational leadership got the highest frequency of 32 or 32.99 percent. In charismatic leadership got the frequency of 29 or 29.90 percent, while democratic leadership has a frequency of 23 or 23.71 percent. And, the laissez-faire leadership has a frequency of 11 or 11.34 percent. However, out of 5 leadership styles autocratic leadership has a frequency of 2 or 2.06 percent.

2. The Level of competence of the respondents in the performance of their supervisory functions.

2.1 Respondents have average level of Instructional Supervision with an (over-all weighted mean = 3.04) with a verbal interpretation of competent.

2.2. Respondents have average level for school improvement function with an over-all ($X = 2.73$) with a verbal interpretation of competent.

2.3 Respondents have average level for pupil development function with an over-all ($X = 3.16$) with a verbal interpretation of competent.

2.4 Respondents have average level for teacher and staff development with an over-all ($X = 2.81$) with a verbal interpretation of competent.

3. The leadership styles of master teachers significantly affect their level of

Competence in performing supervisory functions.

3.1 Respondents have average level for competence of head teachers in performing their supervisory function when grouped according to their embraced leadership styles with an overall ($X^2 = 2.94$) with a verbal interpretation of competent.

3.2 The respondents revealed the significant relationship between the leadership styles and the level of competence of master teachers in performing supervisory function in the area of instruction, the null hypothesis was majority rejected and the rest are accepted. In democratic leadership with a ($X^2 = 51.004$) its probability value of .045 the null hypothesis is rejected. In charismatic leadership with a ($X^2 = 42.385$) its probability value of .002 the null hypothesis is rejected. And also like with the transformational leadership with a ($X^2 = 36.516$) and has a probability value of .002 the null hypothesis. While, the laissez-faire leadership the ($X^2 = 32.511$) its probability value of .093 the null hypothesis is accepted. And the autocratic leadership too, with a ($X^2 = 27.308$) its probability value of .079 the null hypothesis is accepted.

3.3 The respondents for democratic leadership with has a (chi-square value of 56.113) its probability value of .089, charismatic leadership that a ($X^2 = 38.576$) and has its probability value of .05 and laissez-faire leadership with a ($X^2 = 30.431$) its probability value of .077 thus the null hypothesis is accepted, which has no significant relationship between the leadership styles and the level of competence of master teachers in performing supervisory function in the area of school improvement. While the autocratic leadership the ($X^2 = 24.224$) its probability value of .001 while transformational leadership with a ($X^2 = 38.197$) its probability value of .077) and the null hypothesis is rejected.

3.4 The respondents for charismatic leadership with a ($X^2 = 32.442$) and has a (probability value of .000) while, transformational leadership with a ($X^2 = 37.776$) and has a probability value of .000 are significant thus, the null hypothesis is rejected. While, democratic leadership the ($X^2 = 49.152$) its probability value of .078), autocratic leadership with a ($X^2 = 19.791$) its probability value of .203, laissez-faire leadership with the ($X^2 = 26.564$) its probability of .061 thus the null hypothesis is accepted.

3.4 In democratic leadership has a ($X^2 = 32.160$) its probability value of .003, charismatic leadership with the ($X^2 = 44.251$) its probability value of .000, transformational leadership the ($X^2 = 41.384$) its probability value of .024 while, laissez-faire leadership the ($X^2 = 29.662$) its probability value of .048) this means that are significant to the research therefore the null hypothesis is rejected, and the autocratic leadership with a ($X^2 = 20.677$) its probability

value of .083 It means it is accepted and it has no significant relationship between the leadership styles and the level of competence of head teachers in performing supervisory function in the area of teacher and staff development.

4. Base reference for competency upgrading for Head Teachers level of competence in terms of leadership styles that they may be seen for improvement.

Conclusions

Based on the findings of this study, the following conclusions were formulated:

- Respondents have average level of leadership styles embraced by the master teachers and the level of competence in performing their supervisory function, they also vary on their embraced or used to apply or implement that they may part of their ideals.
- Level of competence in performing their supervisory function in instructional supervision, school improvement, pupil development, and teacher and staff development they had different ways of performing function that caters for their specific jobs and tasks.
- The leadership styles of the master teachers do not significantly affect their level of competence in performing supervisory functions.
- The base reference that may recommend is through improvement of in-service trainings and some various seminars, workshops and innovative team building as well, that the head teachers could utilize it in their leadership and supervisory functions and its personal enhancement as a middle manager.

Recommendations

In view of the aforementioned conclusions, the following recommendations are hereby offered:

1. The school heads should implement programs of mass awareness for leadership styles of teachers and its supervisory functions. Teachers should be given an extensive, long- term and continuous professional development plan through seminars/ trainings to improve level of competence in performing supervisory function. These trainings/ seminars should be properly evaluated. The head teacher must have a closer supervision in crafting instructional objectives.
2. The master teachers and teachers should have a shared vision so they will collaboratively relate to each other. The master teachers must provide good models for faculty members are suggested. Since, the school is an organization the head teachers must show a good model of professionalisms.
3. It is highly suggested that the master teachers must have a thorough planning in scheduling activities and the other works in achieving a common goals. The master teachers must include the teachers in identifying strategies for improving student's achievement. It is suggested that the head teachers as one of the leaders in school must assist the teachers to work towards a common goal.
4. Encourage school managers to be acquainted with the art and science of leadership and its competence to supervisory functions in order to support their teachers in schools, and recommends similar study to the future researcher to be undertaken in a broader area to include principal as respondents, other form of principal/head teachers leadership styles and performance in their supervisory functions and the other scale of teacher morale

References

A. Books

- Bago, Adelaida L. (2005) *Supervision of Instruction: The Philippine Perspective* Manila Philippines, De La Salle University Press.
- Bass B.M. (1990) *From Transactional to Transformational Leadership Learning to Share Dynamics the Vision* Organizational Winner.
- Castillo, Emman S. (2005) *Leadership and Management: Twin Towers in Education*, Philippine Educational Manila Philippines, De La Salle University Press.
- Cashin, Roxel A. (2001) *Essentials of Organizational Behavior 1st Edition*. Manila Philippines. Educational Publishing House.
- Daft, Bell J. (2000) *High-performing, high poverty schools leadership* Oaks C.A. A. SAGE Company.

B. Journals

- Barnett, Mc Cormick (2003) *Transformational Leadership in School Panacea, Placebor or Problem*
- Cherry, Kendra (2015) *Leadership that Matters Educational Leadership Journals*
- Costales, H. A. (2003) *Management and Development through Education*, p. 5

- Dela Cruz, Teresita M., (2002) *The Philippine Journal of Education*. pp. 8-10
- Gremley, C. H. (2012). *Expert Noticing and Principals of High-Performing Urban Schools*
- Felton, H. D. (2004) *Leading for learning Sourcebook: Concepts and Examples*.
- Hackman and Johnson (2009) *Leadership Modern and Development*
- Leithwood K. (2005) *Understanding Successful School Leadership: Progress on a Booker Front Journal of Education Administration*.

C. Theses/ Dissertations

- Arcadio, J C (2001) "A Study of the effects of Leadership Styles on Performance in University of Nairobi"
- Andres, L. H. A. (2004) "Variable influencing leadership style and leadership performance of public secondary school in administration in Cotabato Province" University of Southern Mindanao, Philippines
- Bailey, Murphy A. (2004) "Assessing the Instructional Management Behavior of Principals", New York, New York
- Batol, L. A. (2000) "Management practices of Public secondary school administrator in relation to the job performance" University of Southern Mindanao, Philippines
- Castillo, R.D. (2005) "Instructional Leadership Styles of Elementary School Principals in the Division of City Schools, Caloocan City"

The Meaning of Math (Accounting) for Social Science Departments' Students of Vocational School*

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Abstract

The aim of the paper is to classify subjects connected to math education confronted by participant as coming from social science department participant of a vocational school and as given to math lectures, and to classify efficient teaching models seeming not achievable to be applied by the math teachers for vocational school participant. The study used a quantitative study method with a descriptive survey method. The study was directed using of likert-type questionnaires for the social science department participant from a vocational school in turkey. 196 participants were the answered to the study. Findings presented which there was a requirement for a explicit program for participant focusing on basic knowledge and skills and simplifying the content of the math tailored towards participant. Problems met by many of the participant when learning math are in memorizing math content, thinks math is not easy, having trouble in understanding and applying math formulae. If tracing starts in the early scores, participant do not accept the educational structure slabs they want for more progressive education later.

Keywords: vocational school, math, difficulty, academic achievement, learning environment

Introduction

A necessary emphasis transfer from the directorial subjects to the teaching important subjects, the quick answer of instructive organizations to the altering requirements of people is detected in the actions of the managing constructions at all levels of teaching (Kamariah at all., 2010). The development of the educational procedure administration is accepted as one of the main ways of efficient using of lecture material, procedures and human resources. The most efficient is the advance of new procedures of organization and administration built in the world. Math and mathematical sciences are serious and vital to the social, economy and, so progress of recent life a country (of at all, 2017; tola at all, 2017). The instruction of math wants wide-ranging preparation to confirm value teaching structure for the people. Though determined exertions would be had to teach all people, we could not lose vision of the attention of the vocational participant (Şeneldir at all, 2017a; Seita, 2004); Kılıçaslan at all, 2018). Education math for vocational participant is a miracle for some viewpoints and does not frequently happen with simplicity and easily (Wehlage, G.G & Rutter, R.A 1986; Wardhani S and Rumiati 2011; Rizta A, Zulkardi and Hartono Y 2013; Rosita C D 2014).

The important way of the context of the vocational education, meant at the calibration of curricula and educational programs. The summary of the organization of educational credit system has big compensations, as long as the school flexibility of the participant (of at all, 2018; Kahraman at all, 2018; Zhamuldinow, 2013). Changed issues may cause to education problems in math for these participants. The issues are: the math language, symbols, problems in procedure of math, some pictorial mix-ups connected to math education, retention and classification problems, and remarkably much anxiety in connecting with math (Görentaş and Yıldız, 1999; Bilgin at all, 2010; Yıldız and Görentaş; Bilgin and Görentaş, 2008; Valencia and Black, 2002; şeneldir at all, 2017b). Instruction of math for educators and learning math for vocational participant are starting to obtain consideration and educators have planned learning environments that are much inspiring when the process of analyzing of the difficulties are at a increasing phase. Moreover, there are singular requirements, and they would be taken an important consideration by math teachers (Koparan at all, 2018; Kamariah, A.B. At all., 2010).

Educational analyses studies for vocational school education lessons display which some problems in teaching models for learning math are happening in the mat laboratories (Şeneldir at all, 2017c; Wehlage & Rutter, 1989Rohana 2015 Pratiwi W I 2014). The problems are, inadequate pledge which participant have related previous elementary information for learning the lesson and fast degree for presenting lots of the notions. Also, weak of rational consistency in the exhibition of math figures in the lectures and low communication and a lack of group study in many instructional actions. Moreover, inadequate practical exercise of instructors to help the participant transfer from the primary education phase to self-regulating learning and inadequate assessments to confirm which participant recall that they have got at the classrooms (Battal at all., 2017; Bostan, &Durmuş, 2016; Bostan & Durmuş, 2017; Durmuş, 2016; Seita, 2004). The objectives of the study are to determine and analyse;

* A brief version of this article presented at INTE 2018

- *Difficulties connected to math learning met by participant*
- *Difficulties connected to the teaching and learning of math*
- *Education environments for participant in learning math*
- *Effective teaching models commonly applied by math*
- *Effective teaching models which are apparent not possible to be used by math teachers in teaching math.*

Method

The study engaged a “quantitative, descriptive survey” study strategy, including social science departments (accounting, business, marketing) participant in a vocational school in turkey. Vocational school participant usually refers to participant with future academic planning problems and problematic academic accomplishment. 196 participants from social science from 1st year and 2nd year class level was applied for the study. The participant responded “separate 5-point likert measure questionnaires” “representing the level of arrangement to quantified objects in the survey for education math (Kamariah, A.B. at all., 2010). The data were examined with the light of the statistical values.

Findings

Constructed on the founded data composed by the questionnaire, it was expressed which common of the participant were male students about 66% and the other group were female students 34%. The proportion of participant who had accomplish math examinations were not much (21.73%). Additionally, the number of which approved the examinations were fairly little, most participant supposed which math lectures were entertaining and interesting to study. Outcomes exhibited which only about 16.1% of participant respondents don't liked math (table 1).

Table 1: participant view on math

View Category	math	
	frequency	percentage
Enjoy	109	55.6%
Moderate	59	30.1%
Dislike	28	14.3%
Total	196	100%

Participant answers for view of the difficulties at the time learning math specially which the topics were being trained theoretical rather than computational. For understanding of math, two basic problems were emphasized by common in the answers, orderly, on the ‘difficulty to remember formulae’ understood (70.0%) and ‘difficulty to remember math content’ (72.1%). And for the back of the problems connected to the learning of math this showed in table 2, moreover, many of the participant, replayed to test, showed which they met the problems, but a minor percentage had emphasized which they were getting the problems because of common of them did not highpoint the registered problems as they encountered at the time learning math. The outcome on stating the participant’ ‘do not like for math’, a minor proportion specified which they do not like math (16.4%) (table 2).

Table 2: form of participant’ opinions on problems in learning math

Types of problems	Math	
	Yes	No
Do not remember the formulae	70.0%	30,0%
Difficult to remember the math content	72.1%	27,9%
Do not understand the formulas	63.6%	36.4%
The concepts are difficult	58.5%	41.5%
Do not know how to apply the formulae	50.3%	49.7%
Do not understand what teachers are teaching	44.8%	55.2%
Teachers change to new topics very fast	20.5%	79.5%
Dislike math	16.4%	83.6%
Teachers did not give enough examples to answer the questions	11.4%	88.6%
Teachers did not repeat the subject	12.4%	87.6%

Teachers did not explain clearly	10.3%	79.7%
Teachers only asked to do the exercises on the white board	14.6%	85.4%
Teachers make us copy notes	12.7%	87.3%
We were given many problems as homework	16.3%	83.7%

Participant' view to their learning environment is presented following step (table 3). Their level of arrangement of the registered objects, generally, participant present a positive answer to the learning environment in the corresponding school (Kamairah, A.B. At all., 2010). Built on the mean marks, the element that has the maximum level of arrangement was 'most of my teachers taught us with enthusiasm (mean=3.73). The outcome displays which little performance showing participant still could effort to rich the maximum mark possible in the normal condition intervals. Correspondingly, a confident answer to the point 'my discipline teacher takes good care of participant' (41.5% agreed). A confident learning position is replicated founded on responses to some objects, for example, 'almost all of my friends in my class tried to get the best score' (42.2% agreed). 'teachers always want us to produce good work' (53.6% agreed), 'participant in my school integrate well among them' (52.2% agreed), and 'most of my teachers taught us with enthusiasm' (41.7% agreed). Finally, the answers presented which the participant' view to the learning environment of their school was progressive (table 3).

Table 3: participant' view towards their learning environment

Types of problems	Mean	Strongly disagree	Disagree	Agree	Strongly agree
I like my class	3.51	14.8%	18.4%	46.2%	20.6%
Participant in my school integrate well among them	3.34	8.7%	13.2%	55.2%	22.9%
I tried my best to get the highest score	3.22	4.5%	13.8%	40.1%	42.6%
Most of my teachers taught us with enthusiasm	3.61	9.8%	11.9%	41.3%	37.2%
My discipline teacher takes good care of participant	3.70	8.5%	15.2%	40.5%	45.8%
Almost all my teachers are good teachers	2.42	6.5%	23.8%	51.5%	18.2%
Teachers use many methods to teach	3.56	5.8%	16.6%	57.2%	40.4%
Teachers always want us to produce good work	3.31	4.8%	19.6%	52.6%	23.0%
Almost all my friends in my class tried to get the best score	3.35	4.9%	22.3%	41.2%	30.6%
A few participants in my class interrupt while in teachers are teaching	3,07	11.7%	14.1%	46.6%	27.8%
My parents did not help me to be more successful	1.92	40.4%	37.6%	12.8%	9.2%
Participant in my school take good care of the school property	2.53	23.5%	44.5%	24.9%	7.1%
Almost all teachers under-estimated my class	2.11	36.5%	39.6%	24.4%	9.5%
I don't like to study	1.93	36.8%	39.6%	15.5%	8.1%
I go to school not to study but to see friends	1.46	43.0%	46.3%	9.3%	2.4%
Discipline rules are not fair to me	2.70	24.1%	43.8%	22.7%	16.4%
My class was blamed when anything bad happened to the school	1.96	32.5%	36.2%	21.7%	9.6%
Teachers always use harsh words in the class	1.88	31.6%	42.7%	14.6%	6.1%
Almost all teachers expected which we have no future	1.73	33.0%	39.1%	21.0%	6.9%

Result

The construction and development of the teaching value calculation is specific application for the social, technical and vocational education system in turkey. The results connected to participant' opinion of their learning environment display which usually participants are progressive way to their learning environment. Moreover, at

the time data connected to persons who decided to the bad thoughts were examined it was registered which meaningfully low capability participant approved to the undesirable thoughts associated with the maximum skill of accounting department participant.

Findings signed which participant concentrating on main information and abilities and streamlining the context of the math curriculum personalized to participant. Moreover, units for instruction and exercise units could be providing for participant' inspiration to the lectures. Explicit instruction methods for participant were proposed which emphasis on instruction for understanding of main information and abilities, instructors' skills with effective students, teachers be agreed with supplementary educational activities for training of math. Finally, we want to say that teaching mathematics to vocational school participant should be particular stresses on respects to program and instruction methods.

References

- Adieva, A.B., (2016). Current Problems In The Technical And Vocational Education Management System In Kazakhstan. *Journal Of Internet Banking And Commerce*, Vol.21, 75-94.
- Arwinie N 2014 Meningkatkan kemampuan penalaran dan komunikasi matematis serta selfconcept siswa MTs melalui pembelajaran berbasis masalah Tesis (Bandung: Universitas Pendidikan Indonesia)
- Bakar, Kamariah Abu, Rohani Ahmad Tarmizi, Sharifah Md Nor, Wan Zah Wan Ali, Ramlah Hamzah, Arshad Abdul Samad, And Abdul Rashid Jamian (2010). "Teachers And Learner's Perspectives On Learning Math For At-Risks Participants", *Procedia - Social And Behavioral Sciences*.
- Battal, F. Durmuş, İ. Ve Çınar, İ. (2017). The Effects Organizational Citizenship Behaviours And Decision-Making Styles On Transformational Leadership Behavior. *International Periodical For The Languages, Literature And History Of Turkish Or Turkic*, 12 (31), Pp. 1-28.
- Biglin, T. And Görentaş, N. (2008). A Note On Characterization Of $N_u(D_n)$. *International Electronic Journal Of Algebra*, 3, 135-140.
- Biglin, T., Görentaş, N. And Kelebek, I.G. (2010). Characterization Of Torsion Units Of Z_{24} . *Journal Of Korean Mathematical Society*, 6, 1239-1252.
- Bostan, S. Ve Durmuş, İ. (2016). Yöneticilerin Karar Sürecinde Zamanı Kullanması Üzerine Bir Araştırma. *Journal Of Administrative Sciences*, 14 (27), Pp. 277-307.
- Bostan, S. Ve Durmuş, İ. (2017), "An Attempt To Develop A Scale On The Decision Procedure: The Manager Decision Time Scale", *Hacettepe Sağlık İdaresi Dergisi*, 20 (2), Pp. 125-141.
- Durmuş, İ. (2016). Tv Reklamlarının Tüketicilerin Tutum Ve Motivasyonları Üzerindeki Sosyo-Ekonomik Etkileri: Üniversite Öğrencileri Üzerine Bir Uygulama. *The Journal Of International Scientific Studies*, 1 (1), Pp. 28-40.
- Görentaş, N. And Yıldız, M. (1999). A Characterization Of Idempotents And Idempotent Generators Of Q_s . *Bulletin Of Pure And Applied Sciences*, 18(2), 289-292.
- Kahraman, K., Of, M. And Tola, Y. (2018). Accounting And Task Application Participant' Learning Styles In Distance Education. *The Online Learning Of Distance Education And E-Learning*, 6(2), 16-20.
- Kamariah, A.B., Rohani A.T., Sharifah M.N., Wan Zah Wan A., Ramlah H., Arshad A. And, Abdul Rashid, J., (2010). Teachers And Learners' Perspectives On Learning Math For At-Risks Participant. *Procedia Social And Behavioral Sciences*, 8(C), 393-402.
- Kılıçaslan, I., Aydın, S., Türkeri, K. And Soydaş, H. (2018). Attitudes Towards Online Web Assisted Learning: Accounting And Tax Participant. *The Online Learning Of Distance Education And E-Learning*, 6(2), 27-33.
- Koparan, B., Akça, Ü., Köş Aydın, F. And Aydın, S. (2018). On The Attitudes Of Construction Technology Participant Towards Information And Communication Technology. *The Online Learning Of Distance Education And E-Learning*, 6(2), 67-73.
- Of M., Şeneldir O., Tola Y., Koparan B., Kahraman K. (2017). Scorm Nesneleri İle Etkileşimli Eğitim. *Turkish Online Journal Of Educational Technology*, Si, 64-72
- Of, M., Kahraman, K. And Kudu, M. (2018). Computer Programming Participant' Attitudes In Distance Education. *The Online Learning Of Distance Education And E-Learning*, 6(2), 41-45.
- Programme for International Student Assessment 2015 Draft mathematics framework (<http://www.oecd.org/pisa/pisaproducts/pisa2015draftframeworks.htm>)
- Rohana 2015 The enhancement of students' teacher mathematical reasoning ability through reflective learning *Journal of Education and Practice* 6 108
- Pratiwi W I 2014 Penerapan metode penemuan terbimbing untuk meningkatkan kemampuan pemahaman dan penalaran matema
- Seita, J. (2004), Strength-Based Approaches Expand Into Leadership, *Reclaiming Children And Youth*, Vol. 13 No.1, 22-5.
- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional And Social Intelligence Against Inertia. *Turkish Online Journal Of Educational Technology*, Si, Pp.229-234.

- Şeneldir, O., Kudu, M. Genel, Y, Akça, Ü., Soydaş, Aydın., S. (2017b). Types Of Behavior In Businesses And Resistance To Individual Change. *Turkish Online Journal Of Educational Technology*, Si, Pp.843-848.
- Şeneldir, O., Aydın, S., Kudu, M., Kılıçarslan, I., Of, M. & Mutlu, C. (2017c). Kaizen And Intuition In Stress Management. *The Turkish Online Journal Of Educational Technology*, Si, Pp. 345-349.
- Tola Y., Aydın S., Şeneldir O., Mutlu C., Koparan B., Of M. (2017). Meslek Yüksekokulu Öğrencilerinin Memnuniyet Düzeyleri Üzerine Bir Araştırma. *Turkish Online Journal Of Educational Technology*, Si, 607-610.
- Valencia, R., Black, M (2002). "Mexican Americans Don't Value Education! The Basis Of The Myth, Mythmaking, And Debunking", *Journal Of Latinos And Education*, Vol. 1 No.2, Pp.81-103.
- Wehlage, G.G & Rutter, R.A (1986). Dropping Out: How Much Do School Contribute To The Problem? *Teachers College Record*. 87(3), Available At [Http://Www.Tcrecord.Org/Pdf/660.Pdf](http://www.tcrecord.org/Pdf/660.Pdf)
- Wardhani S and Rumiati 2011 Instrumen penilaian hasil belajar matematika SMP: Belajar dari PISA dan TIMSS (Yogyakarta: P4TK Matematika)
- Rizta A, Zulkardi and Hartono Y 2013 Pengembangan soal penalaran model TIMSS matematika SMP Jurnal Penelitian dan Evaluasi Pendidikan 17 230
- Rosita C D 2014 Kemampuan penalaran dan komunikasi matematis: Apa, mengapa, dan bagaimana ditingkatkan pada mahasiswa Jurnal Euclid 1 33
- Yıldız, M. And Görentaş, M. (1996). On Homogenous Maps. *Yüzüncü Yıl Üniversitesi Eğitim Fakültesi Dergisi*, 1(2), 14-149.
- Zhamuldinov V.N (2013). Some Words About The Correctional Education Problems Of Prisoners. *Middle-East Journal Of Scientific Study* 13: 616-620.

The Mediator Role Of Family Support In Relation Between Continuous Anxiety And Mental Toughness In Athletes

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Abstract

The objective of this study is to examine the mediator role of family support in the relation between continuous anxiety and mental toughness in athletes. The research group was composed of 236 athletes ($Age_{Mean}: 20,83 + 2,787$) in total, 120 of whom were females ($Age_{Mean}: 20,32 + 1,515$) and 116 of whom were males ($Age_{Mean}: 21,38 + 3,591$), who were actively dealing with sports. The participant athletes initially filled the voluntary participation forms, which were prepared by the researchers, and then they filled the data collection tools determined within the framework of the study. In order for the collection of data, Multi-Dimensional Social Support Scale, Mental Toughness Scale, and continuous anxiety sub-scale of State-Trait Anxiety Inventory were used. In the preparation process of the data collected, it was observed that 14 participant athletes filled the scales erroneously, and the analyses were evaluated based on 236-athlete sample. In the analysis of the data, in order to determine the relations among the variables, firstly, Pearson correlation analysis was conducted, as per determining the mediator role of the family support between continuous anxiety and mental toughness, PROCESS macro regression analysis was conducted. For testing whether the mediator role was significant, Sobel z test was used. The analyses were conducted in 95% confidence interval. For the analyses of the research, SPSS 22.00 package program was used. When the findings of the research are examined, it is observed that the continuous anxiety levels of the athletes have a negative linear relation with both the family support and mental toughness. Moreover, as the main hypothesis of the research, according to the findings regarding mediator role of the family support in relation between continuous anxiety and mental toughness, it was determined that the negative effect of continuous anxiety on mental toughness was decreased with family support and its negative effect was decreased. As the conclusion, it can be stated that mental toughness levels of the athletes have a negative relation with their continuous anxiety levels, and that family support can be benefited in decreasing the role of the continuous anxiety concerning the mental toughness performance.

Keywords: *Anxiety, Family Support, Mental Toughness, Athlete.*

Introduction

The concept of mental toughness has attracted much attention by sports psychology researchers, who have been trying to understand how psychological factors can support the success in sports (Bull, Shambrook, James and Brooks, 2005; Gucciardi, Gordon and Dimmock, 2008; Jones, Hanton and Connaughton, 2007). In developing literature, mental toughness is thought to be multidimensional and important psychological factor (including cognitive, affective and behavioral components) and associated with successful sports performance (Bull et al., 2005 ; Clough, Earle and Sewell, 2002 ; Connaughton, Wadey, Hanton and Jones, 2008; Kabuk & Clough, 2005; Jones et al., 2007). Unfortunately, there are different perspectives on this construct. For instance, while some researchers suggest that mental toughness can explain how physically skilled athletes become elite athletes (Gucciardi et al., 2008), some assert that the athletes having a proper mixture of physiological, anatomical and psychological features are more likely to display a successful sports performance (Crust, 2008).

When the evidence collected from two different qualitative studies conducted with elite athlete samples are examined (Bull et al., 2005; Connaughton et al., 2008), it is shown that the environmental factors such as motivational environment, family influence, the exposure to the environment in which one has grown up and challenging context (competitive) have critical role in the development of mental toughness. In this direction, the importance of family support, which is one of the cornerstones of social support, in the development of mental toughness is seen.

On the other hand, anxiety is the uneasiness, a type of fear feeling, against the events that the individuals do not know the source, however, accept that they are dangerous and threatening (Özgül, 2003). When viewed from this aspect, trait anxiety is the perception of the stressor conditions being dangerous and threatening, and increment of emotional reaction frequency and intensity, and gaining continuity (Öner, 1994). Konter (1996) defined trait anxiety as “the tendency to perceive certain situations as dangerous and threatening, and an athlete’s personality

tendency.”

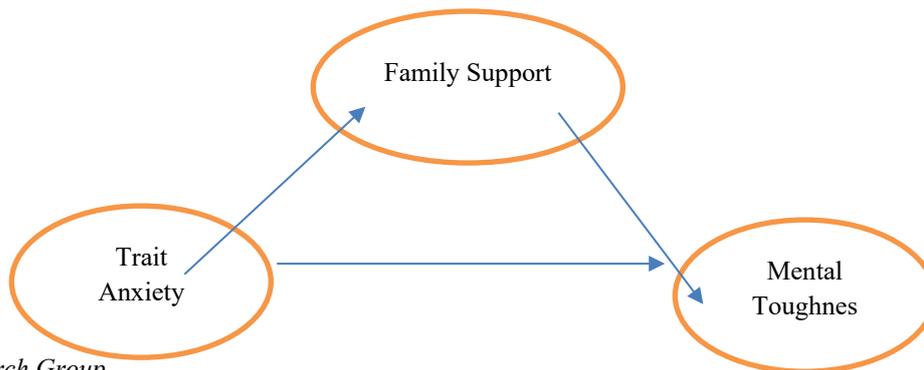
In this context, this study aims to determine the role of family support in the relationship between trait anxiety and mental toughness of athletes.

Method

Research Model

This study is a relational screening model study designed to examine the role of family support in the relationship between trait anxiety and mental toughness. Karasar (2009) defined the relational screening models as the research models aiming at finding out the existence and degree of covariances between two or more variables. In line with this model, the role of self-esteem in the relationship between passion and psychological resilience levels of athletes. In this model, the role of self-esteem in the relationship between passion and psychological resilience levels of athletes will be examined. The hypothesized model is displayed below.

Figure 1: Research Model



Research Group

120 females (Age_{mean}: 20,32 + 1,515) and 116 males (Age_{mean}: 21,38 + 3,591), totally 236 athletes (Age_{mean}: 20,83 + 2,787), constituted the research sample. The athletes participated in the study filled the volunteer participation form first, then they completed the data collection tools. The sports experience mean score of the athletes was Year_{mean}: 9.21 + 3.86.

Data Collection

For the data collection, Multi-Dimensional Social Support Scale, Mental Toughness Scale, and Trait anxiety sub-scale of State-Trait Anxiety Inventory were used. In the preparation process for the analysis, it was observed that 14 participant athletes filled the scales erroneously, and the analysis was done based on a 236-athlete sample.

Multi-Dimensional Perceived Social Support Scale:

Zimmet and Dahlem (1988) developed the Multi-Dimensional Perceived Social Support Scale. Eker and Arkan (1995) adapted the scale to Turkish society. The scale includes twelve items that can be understood by the people at any educational level. The higher the scores, the higher the perceived support and the lower the scores, the lower or lack of the perceived support (Eker and Arkan, 1995).

State-Trait Anxiety Scale:

State-Trait Anxiety Scale was developed by Speilberger et al. (1970) and adapted to Turkish society by Öner and Le Compte (1985). The scale is a Likert type scale and includes 40 items assessing state and trait anxiety separately. The higher the scores, the higher the anxiety level and the lower the scores, the lower the anxiety level. The scale, translated into Turkish and tested the validity and reliability in 1975, has the sub-scales of 20-item state and 20-item trait anxiety. The total score of the whole scale ranges between 20 and 80. The higher the scores, the higher the anxiety level and the lower the scores, the lower the anxiety level (38). The items are rated between 1 and 4 including “never” and “completely” (39). The validity and reliability studies of the inventory in Turkey were conducted by N.Öner in 1977 (39). There are two different statements in the State-Trait Anxiety Inventory. The direct statements indicate the negative emotions; reverse items indicate positive emotions. The reverse items in state anxiety inventory are 1,2,5,8,10,11,15,16,19 and 20 . The reverse items in trait anxiety are 21,26,27,30,33,36, 39 and 13. The mean score of the reversed items is subtracted from the mean score of the direct items after calculating the mean scores of direct and reverse items separately. Predetermined and unchanging value is added to this value. The unchanging value for state anxiety is 50, the one for trait anxiety is 35. The final value is the individual’s anxiety score. State Anxiety Scale (SAS) is a sensitive tool to assess the suddenly changing emotive reactions. The Trait Anxiety Scale (TAS) including 20 items in the second part of the scale assess the continuity of the anxiety that the individual generally tends to experience. Scores are between 20 (low anxiety) and 80 (high

anxiety).

Data Analysis

First, Pearson Correlation analysis was used to determine the relationships between variables; PROCESS macro regression analysis was used to find out the role of family support in the relationship between trait anxiety and mental toughness. The analysis was done at a 95% confidence interval. Sobel z test was used to determine whether the mediation was significant. SPSS 22.00 program was used for the analysis.

Findings

Table 1: The relationship between trait anxiety, mental toughness, and family support

		Mental Toughness	Trait Anxiety	Family Support
Mental Toughness	Pearson Correlation	1		
	Sig. (2-tailed)			
	N	236		
Trait Anxiety	Pearson Correlation	-,173**	1	
	Sig. (2-tailed)	,008		
	N	236	236	
Family Support	Pearson Correlation	,425**	-,258**	1
	Sig. (2-tailed)	,000	,000	
	N	236	236	236

** . Correlation is significant at the 0.01 level (2-tailed).

When table 1 was examined, it was found that the relationships between trait anxiety and mental toughness (r: -.173), family support and mental toughness (r: .425), trait anxiety and family support (r: -.258) were significant (p<0.05).

Research Model

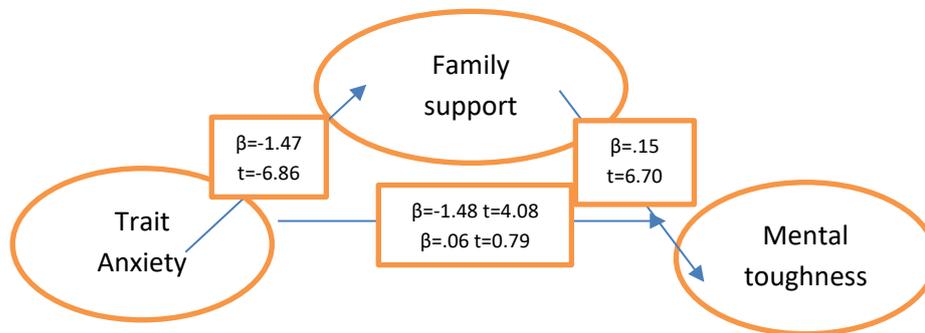


Figure 2: The role family support in the relationship between trait anxiety and mental toughness

The determination that there is a negative and significant relationship between trait anxiety and mental toughness allows testing the hypothesized mediation relation. PROCESS macro regression analysis was used to find out whether family support played a mediation role in the relationship between trait anxiety and mental toughness. In the first step of PROCESS macro regression analysis, the predictive effect of trait anxiety level on family support was examined and it was observed that trait anxiety ($\beta=1.47$, $t= 6.86$, $p<.05$) explained the 18% of the total variances associated with family support ($R=.42$, $R^2=.18$, $F= 47,13$, $p<.05$).

In the second step of the PROCESS macro regression analysis to determine whether family support played a mediation role in the relationship between trait anxiety and mental toughness, the predictive effect of trait anxiety level on mental toughness was examined. When the results were examined, it was observed that trait anxiety ($\beta=-.134$, $t= -2, 02$, $p<.05$) explained the 2% of mental toughness level ($R=.134$, $R^2=.02$, $F= 4,08$, $p<.05$).

In the third step of PROCESS macro regression analysis to determine whether family support played a role in the relationship between trait anxiety and mental toughness, family support was included in the PROCESS macro regression analysis and found that it was seen that family support contributed to the prediction of mental toughness at the level of 1%. Accordingly, it was found 14% of the total variances was explained via family support in the prediction of mental toughness by trait anxiety ($R=.47$, $R^2=.14$, $F=27.54$, $p<.05$). In the third step of the analysis, it was observed that the effect of trait anxiety on mental toughness decreased ($\beta=.07$, $t=1.92$, $p>.05$). Thus, it can be said that family support has a full mediation role in this relationship ($\beta= .22$, $t=-6.73$, $p<.05$).

Table 3: The results related to the direct and indirect effects of trait anxiety on mental toughness

Direct Effect			Effect	S.E	LLCI	ULCI	t	p
Trait Anxiety	Mental toughness		-.0891	.0286	-.1540	-.0399	2.6852	.0078
Indirect Effect			Effect	S.E	LLCI	ULCI	t	p
Trait Anxiety	Family Support	Mental toughness	-.0576	.0419	-.1599	-.0447	-2.1091	.0085
Total Effect			-.1467	.0546	-.2543	-.0391		
Normal Theory Test for indirect effect								
Effect: -.0892			s.e: .0258		z: -3.4496		p: .0006	

In table 3, it was found that total effect (direct + indirect) of trait anxiety on mental toughness was negative ($\beta: 0,089 + 0,071=0,434$) and statistically significant ($p=0,000$). Because the Z score (-3,450) of this model was bigger than 1,96 and significant, the existence of a mediator effect can be said.

Conclusions

This study aims to determine the role of family support in the relationship between trait anxiety and mental toughness of athletes. 120 females ($Age_{mean}: 20,32 + 1,515$) and 116 males ($Age_{mean}: 21,38 + 3,591$), totally 236 athletes ($Age_{mean}: 20,83 + 2,787$), constituted the research sample. The athletes participated in the study filled the volunteer participation form first, then they completed the data collection tools. When the results were examined, it was found that total effect (direct + indirect) of trait anxiety on mental toughness was negative ($\beta: 0,089 + 0,071=0,434$) and statistically significant ($p=0,000$). Because the Z score of this model was bigger than 1,96 and significant, the existence of mediator effect can be said.

When the results are examined, trait anxiety levels of the athletes negatively and linearly correlated with both family support and mental toughness. Moreover, according to the fundamental hypothesis of the study that family support had a mediation role in the relationship between trait anxiety and mental toughness, it was found that the negative influence of trait anxiety on mental toughness via family support. When related literature is examined, it is stated that mentally tough individuals tend to be social and extrovert. Because they stay calm and comfortable and have lower levels of anxiety than others, it was suggested that these individuals relatively stay unaffected from competitive and stressful conditions with the self-belief and the steady belief about controlling their destiny (Clough et al., 2002).

Considered from this perspective, negative relationship between mental toughness and trait anxiety coincide with related literature. For social support, in the study by Petrie, Deiters & Harmison (2014), in which the mediation roles of athlete's identity, social support and mental toughness in stress levels were examined, the positive contribution of mental toughness and social support was explained. Hence, it can be said that family support, which is an element of social support has a mediation role in the relationship between mental toughness and trait anxiety.

Consequently, it can be said that the mental toughness of the athletes has a negative relationship between trait anxiety levels, family support can be utilized to reduce the role of trait anxiety regarding mental toughness performance.

Author Note

This study is an improved version of the oral presentation presented in the International Conference on New Horizons in Education held between 18-20 July.

References

- Bull, S. J., Shambrook, C. J., James, W., & Brooks, J. E. (2005). Towards an understanding of mental toughness in elite English cricketers. *Journal of applied sport psychology*, 17(3), 209-227.
- Cebeci, S. A., Aydemir, Ç., & Göka, E. (2002). Puerperal dönemde depresyon semptom prevalansı: obstetrik risk faktörleri, kaygı düzeyi ve sosyal destek ile ilişkisi. *Kriz Dergisi*, 10(1), 11-18.
- Clough, P. J., Earle, K., & Sewell, D. (2002). Mental toughness: The concept and its measurement. In I. Cockerill (Ed.), *Solutions in sport psychology* (pp. 3243). London: Thomson
- Connaughton, D., Wadey, R., Hanton, S., & Jones, G. (2008). The development and maintenance of mental toughness: Perceptions of elite performers. *Journal of Sports Sciences*, 26, 8395.
- Crust, L. (2008). A review and conceptual re-examination of mental toughness: Implications for future researchers. *Personality and Individual Differences*, 45, 576583.

- Crust, L., & Clough, P. J. (2005). Relationship between mental toughness and physical endurance. *Perceptual and Motor Skills*, 100, 192-194.
- Eker D. & Arkan, H. (1995). Çok boyutlu algılanan sosyal destek ölçeğinin faktör yapısı geçerlik ve güvenilirliği. *Türk Psikoloji Dergisi* 10 (34): 45-55.
- Engindeniz, A. N., Küey, L., & Kültür, S. (1996). Edinburgh doğum sonrası depresyon ölçeği Türkçe formu geçerlilik ve güvenilirlik çalışması. *Bahar Sempozyumları*, 1, 51-52.
- Gucciardi, D. F., Gordon, S., & Dimmock, J. A. (2008). Towards an understanding of mental toughness in Australian football. *Journal of Applied Sport Psychology*, 20(3), 261-281.
- Jones, G., Hanton, S., & Connaughton, D. (2007). A framework of mental toughness in the world's best performers. *The Sport Psychologist*, 21(2), 243-264.
- Karasar, N. (2009). Bilimsel araştırma yöntemi (19. bs). Ankara: Nobel yayın dağıtım.
- Konter E (1997) Profesyonel Futbolcuların, Profesyonellik Yılı Sürelerinin Durumluk Kaygıları Üzerine Etkisi, 6. Ulusal Spor Hekimliği Kongresi Bildiri Özetleri, İzmir.
- Lecompte, A. & Öner, N. (1975). Durumluk-Sürekli Kaygı Envanterinin Türkçe'ye Adaptasyon ve Standardizasyonu ile İlgili Bir Çalışma. IX. Milli Psikiyatri ve Nörolojik Bilimler Kongresi Çalışmaları, 457-462.
- Öner N. (1994) Türkiye'de Kullanılan Psikolojik Testler, Boğaziçi Yayınları, İstanbul.
- Öner, N. & Le Compte, A. (1983) Durumluk Sürekli Kaygı Envanteri El Kitabı, İstanbul, Boğaziçi Üniversitesi Yayınları.
- Özgül F (2003) Beden Eğitimi ve Spor Yüksek Okulu Öğrencilerinde Durumluk ve Sürekli Kaygı Düzeyleri, Cumhuriyet Üniversitesi Sağlık Bilimleri Enstitüsü Yüksek Lisans Tezi, Sivas.
- Petrie, T. A., Deiters, J., & Harmison, R. J. (2014). Mental toughness, social support, and athletic identity: Moderators of the life stress-injury relationship in collegiate football players. *Sport, Exercise, and Performance Psychology*, 3(1), 13.

The Museum-Based Education As A Kind Of Art-Therapy. Considerations

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Abstract

According to Hein the museum-based education is addressed to every individuals and groups. Puttman-Gelles underlines that "the purpose of art museum education is to enhance the visitor's ability to understand and appreciate the original works of art and to transfer (...) experiences into other aspects of visitor's lives". Museum-based education supports participants' reflection, invites them to build personal connections and builds the sense of community. It invites visitors to share their thought and feeling, memories and associations. The museum-based education as a form of art therapy use narrative methods, artwork, discussion as well as object therapy. The therapeutic tools of museum-based education are linked with dialog, interpretation, locality and memory - these aspects of museum-based therapy will be presented in the paper. The museum-based education answers at Maslows needs and can be compared with social work. It approves the goals of every education process are to educate and shape of pupils. The beneficial result of the education is wellbeing.

Introduction

Both educational and therapeutic practice of museum-based education consists in creating the physical and mental space of participants' development, supporting and facilitating the process of their creative and personal experience. Both activities use their resources to support pro-health activities, understand students' needs and enable them to prepare themselves for working in the everyday world. Both are finally entangled in the processes of interpretation and evaluation of human experience (Silverman 1989) and apply art as a communication tool or even support interaction with art. Art in both cases can be, as Mark O'Neil (2010) points out, prescribed. The very idea of the art of prescription is based on the belief that creative action, building a safe environment conducive to creativity has both educational and therapeutic dimensions. It is also a space that allows sharing of experience, building a sense of being accepted and belonging to *communitas*. It is the community of experience, commitment and analysis that has a therapeutic function. As emphasized by Elaine Aegyle and Gillie Bolton (2005): art does not have to be treated as a therapy vehicle, but it should be perceived as a therapeutic one.

Art is based on joint action, exchange of views, empathy and commitment. Such art functions are described, among others, by Swedish researchers as a "determinant of survival" (Konlaan, Bygren, Johansson 2000), because regular participation in the cultural life raises the frame of mind, leads to the perception of being a healthy person, absorbs the tension of the recipient and becomes a pleasure, and thus, reduces the level of stress and even promotes longevity (Johansson 1996). And perhaps all these effects are not so much the result of the action of art itself, but rather of social interaction, cultural involvement or catharsis. Some attempt to explain the phenomenon of therapeutic action of art and find its rational justification, link the activity of visiting a cultural institution with physical activity. They prove that visiting a museum or going to the cinema or theater is associated with moving: walking, strolling - it is this action that is the source of improvement of the physical and mental health of the recipients of art. However, it is indisputable that art affects the well-being, vitality and social functioning of the participants of cultural life. Participation in cultural events is therefore described as a cultural stimulus, and experiencing art as self-regenerating. Art stimulates creative behavior and positive attitude towards people, shows life as more significant and restores its meaning. What's more, scientists prove that art can become a mild addiction (O-Neil 2010), a dependency. And as Mark O-Neil emphasizes: "people must have a place where they can go out with their loved ones, they need their free time, when they do not work, to be meaningful and give meaning to their lives. Participation in culture is an important contribution to their quality of life, which should become an integral part of public health policy" (23).

Museum-Based Education And Therapy

Searching for the correct and effective relationship between education and therapy or building it is an element of museum education, and further a tool for therapy and individual understanding of oneself. Lois H. Silverman (2002) suggests that the museum contributes to the promotion of well-being and mental health in five ways: promotion of spending free time and rest; intervention and stimulation of beneficial changes in psychology and emotions or both; introspection affecting the mental health; supporting pro-health education; strengthening environments and healthcare institutions. Also Simone Alter Muri (1996) described the museum's activities in therapeutic categories,

pointing to its role in strengthening self-esteem, sublimation, socialization skills, introspection and creativity. Positive relation of experience-museum, participant-community is then transposed into the relationship of disease, lifestyle - health. And the main tools of museum-based therapy or gallery-based therapy are: dialogue, the opportunity to tell your story using museum objects and museum space or outside it - in the local space, often used by museum workers, referring to heritage and glacial memory. Dialogue as this element, which, according to Silverman, should be stimulated in the museum, especially discussions on so-called sensitive topics that allow the unconscious to become more aware, has an important therapeutic function. On the one hand, it is a reference to the philosophy of conversation, in the context of which the conversation is accompanied by mutual acceptance and affirmation of the individual. In addition, the very fact that the museum is open, accessible to all recipients, makes them a place for group and individual therapy. What is more, the fact that everyone can use the collection, independently read it and use it in a creative way, results in new recipients for the museum. Many participants of therapeutic activities visit the museum for the first time. Zhvitiashvili (Peacock 2012) calls the therapeutic attitude in the museum a "new dimension" expanding educational activities and inviting new audiences. Studies show that museums that have a special offer for people with dysfunctions are more likely and more often visited by people without any dysfunctions for two reasons. First, the ramps, lifts located in these institutions are used by, for example, parents with small children, which affects the fact that they go to this museum and not another. In addition, in the public opinion, institutions open to contact with people with disabilities are perceived as more hospitable, tolerant, benevolent, liberal, accessible, and building community. The museum thus becomes a safe place, a place of mutual acceptance. A space that allows you to overcome physical, mental and emotional barriers of people with dysfunctions or problems, as well as people who accompany them. Museum therapy has two faces: it is the therapy of disabled people, but also those who are able to learn to be open to otherness. A museum that often explores art as an element of influence during educational events, as Ray William (2010) emphasizes, allows to create an environment to support reflection and a sense of community. The museum is a space of peace and fantasy, a place for individual transformation and the preservation of the group's sense whether in a family, class, among friends or just a community of visitors and participants in a given event.

In this sense, the museum and its educational activities are close to the definition of art therapy created by American Art Therapy Association. She says that art therapy takes place using broadly understood art and media treated as a basic way of communication in a support environment in a creative process, the result of which is exploring feelings, controlling behavior, controlling anger, reducing anxiety, solving emotional conflicts, supporting self-awareness, developing social skills and competences, improving world orientation, raising self-esteem or self-imagination. Therapy leads to development through research and development of storytelling skills, personal extraction, individual narration through discussion and analysis of art, or transposition of emotions and problems into art. Art turns out to be a way to stabilize and express yourself, your defects, humors, problems. Museum-based therapy therefore refers to art therapy: plastic therapy, biblio-therapy, music therapy, teatro-therapy, drama, sometimes choreotherapy, but always with the use of museum exhibits, and successfully used in work with people suffering from cancer, diseases associated with the loss of memory, mental illness, developmental genetic diseases, mood disorders, social isolation, homelessness, traumatic experiences and post-traumatic stress, addictions, etc. Each condition can be treated by means of intellectual action or artistic. For people with memory problems, for example, the use of art materials alone, planning work can be therapeutic activity. Even more effective are the so-called memory walks and workshops of packing the suitcase in the right items before the trip, as well as meetings after the workshops in museum cafes, where informal conversations can take place. Sometimes debates are needed to stimulate the conversation of people with therapists or healthy people about similarities and differences, but also shared values - such meetings allow sharing their own experience, creating *communitas* and showing problems from many perspectives and ways of solving them and difficulties in finding them. Therapeutic functions also have joint activities - for example, work on the preparation of a temporary exhibition.

Therapeutic Methods Of Museum-Based Education

The therapeutic function has an interactive tour or walk. Using the collection to engage visitors, illustrating a certain idea and value, and overcoming social barriers is a very important and vital function of the educational mission of museums. An important role here is again exhibits, objects that stimulate activities, thought processes, stimulate creativity. These are intended to serve visitors, help their development. The task of museum professionals is therefore to show their possibilities, making them available to anyone who wants to see them. They indicate that the museum is important for people, objects and their experience, not just watching. According to Stephen Weil (1999) museum from institution has turned into an institution for someone. In this way, by becoming an institution of social change, it can even be a social space. Sometimes exhibits can be touched, which is not destructive for them. On the occasion of touch, you can also refer to the sense of smell - for example, the smell of sandalwood, from which it is made an

object. In this way, the collage becomes an element of multi-sensory experience (Classen 2007). Sometimes *museum exhibits* are only observed, but they can also be a contribution to social debate, the beginning of conversations, inspiration of artistic works, creation of thematic collections, reminiscences. It shows how surrounding objects affect people lives, how they can stimulate or strengthen well-being. Hence, in the literature on the subject, the term *object therapy* or *object-relations therapy*. It refers to personal or emotional relationships with objects and the object / exhibit itself treats as an aid in understanding how and why people interact with objects, and how objects represent human identity. The exhibits also enable emotional engagement, unblocking emotions and openness to a new perspective about oneself and the environment as well as interpretations of the world. Objective therapy and artefact makes a suggestive laboratory for understanding the relationship between people and things (Silverman 2010). Of course, this relationship will depend on the culture - in different cultures, objects are treated differently and attached to them more or less heavily. Tradition, historical knowledge, approach to the past, own experiences determine the cost of *museum exhibits*. They can be treated superficially as an element of consumption and permanent exchange, an impermanent thing, but you can also see in them an element of perfection, beauty, a sign of durability and continuity. In Japanese culture, for example, damaged ceramic items are restored in such a way that traces of repair are visible. In the place of glue, craftsmen apply gold or silver varnish, in order to give the object an additional value, to mark the trail of time on them, to sacrifice a new life or to show its history.

Museum like *Kintsugi / kintsugi* gives new meaning to objects, testify to the history, be part of the heritage, the product of human creativity, culture and become the basis or inspiration for new, individual history attenuated by the participants of education. These exhibits are therefore subject to a specific recycling - it gains the rank of an element of life of visitors, a way to express their emotions, a part of *storytelling*. Their transformation is a prerequisite for transforming storytellers. They allow you to tell a story, become its inspiration. The very fact of expressing yourself or your experience by means of storytelling becomes an essential element of therapy. And it is not the content of the story that is important, but the fact of telling a story, preparing it, presenting it. The storyteller becomes the owner, the subject of a unique, personal story and a new experience of exploring and expressing himself in a safe environment. In a creative way, he absorbs the sense of being and learns the different perspectives of self-assessment, his experience, which leads to empowerment and insight. History becomes a record or a metaphor of emotions, experience and well-being. And the fact of its disclosure leads to social involvement and a sense of communication with the group. And it is the feeling of belonging and being a part of the non-appreciation community that becomes the most important discovery for participants of therapy using the subject and *storytelling*. Not only art or storytelling, therefore, become a tool for therapy but the environment and atmosphere of their creation and sharing.

This form of education refers to the treatment of exhibitions or specific exhibits as enabling individual reflection. The same items can lead to completely different stories. They constitute a certain frame or reference point of the story.

Therefore, object therapy is described as an effective work to improve the well-being and presents for inclusion as part of the museum collection, or even intervention in many assisting institutions (Chatterjee 2008). It leads to life satisfaction, self-appreciation, makes it possible to see the intimate or imagined relationship with the exhibit. Although it might be better at this point to use the term the *extremity* that Slavoj Žižek follows Lacan. This category is a combination of what is external and intimate. Tony Meyers in the introduction in the Guide of Political Critique, devoted to the philosophy of the Slovenian thinker explains *extimacy* appealing to the eye vision. "If it seems to you a bit difficult to imagine - he explains to readers - think about the eyeball. You can see everything except what you can see - your own eyeball. The only way to see her is to look in the mirror, which is something external. The thing is similar with the subject: it is the point of view from which we look at reality, but which cannot be seen directly - it is necessary to use it for that purpose >> the mirror of << reality ' (Myers 2009). This mirror is a museum and its exhibits. It is in the narration of a storyteller narrated by museums that he discovers fragments that reflect his experience. What's more, the story is an intimate confession that also becomes *Extreme*, because it becomes public and can in a performative way influence the observers of the process of storytelling, recipients of history, stimulating them to tell their own story. There is a vanishing of the distinction between what is intimate and public, and the status of an *extreme*. Storytelling used in the museum as an element of education both inscribed in the narrative of the exhibition, the selection of artifacts, and the actions of the participants, thus begins to be a way to construct themselves as a person and a member of a given group. The story inspired by the exhibit is not only related to the remembrance and mimetic reproduction of what was, but also to creative thinking, imagining, creating a colorful story inspired by a story, subject, people, memory. *Storylines* are part of the personal narrative, which, however, are entangled in the social, cultural, political and historical context. Individual story overlaps the story of other group members and uses discourse or cultural model. *Personal story* refers to a unique, individual experience inscribed in the social order, a common story of a given group and a dominant cultural narrative known and reproduced by a social group in a given

place and time. Therefore, personal history seems to be determined and it is impossible for it to be freed from the universal narrative. Of course it can modify existing narrative, deny it, or replace, but will always be set against the dominant cultural narrative - compared to it, recognized it as such. Personal narration will therefore be a sub-narrative. Therefore, each museum story, both presented by museum professionals: curators and educators, as well as the one presented by the recipient whether publicly or intimately participates in the construction of the image, image of the individual and the group, which becomes an element of common, cultural narrative. The artifact is an essential element of this story - it testifies to a certain continuity, attributes specific details to the stories, places it at the time of the exhibit's origin and telling about it, and proves how this story has changed, how the story was different. One can apply the metaphor of the new literary machine used by the German playwright Heiner Müller to this history of the subject, reformulating it into the idea of a new narrative machine. To describe the story, Müller started a *new literary machine*, that is, he undertook a dialogue of the present with the past. This dialogue was to lead to the presentation of objective truth and in a performative way to influence the viewers - to stimulate their reflection. The playwright believed that "confusion (...) matter can create such a relationship between [the past] and the present, which can be called a *fiction of fact*, that is, an expression of what actually happened or edited, in the medium of linguistic fiction" (Walerich-Szymani 2004:77). That fiction actuality called by him *new literature engine* serves the purpose of finding the difference and similarities in the still repeating patterns and its present form. So to describe what is postmodern perception of everyday life as a result of certain events of history or heritage elements, should focus on the space between the two poles of time. Think about what the artifact was, what it proves, why it testifies what it witnessed, what it punishes remember and how it relates to an individual story, where a social story, a cultural code is caught up in a narrative, determines or shapes the history of an individual. Then reflect on what this object is today, what history allows to tell, which, according to museologists, is to tell why it is located in a specific place. These relations between the current meaning of the subject and its useful function in the past and between individual and social history constitute a narrative machine, allow to bend over the meaning of the past, its interpretation and the meaning of the individual past and its consequences. The metaphor of the narrative of the new machine allows you to show the history of (re)conceived of object show stories about *storytelling* as well targeted narrative, which often distorts, blurs or deconstructs the cyclical trend of autocratic history. And only the launch of a *new narrative machine* allows its disclosure and empowerment. Therefore, the concept of using museum objects to reflect on oneself and on general history it corresponds to the postmodern vision of the past based on a grid model, consisting in the reproduction of certain patterns, discourses - their repetition, transformation, exploitation, appealing to them, to say what is *extreme*.

Subject therapy therefore allows you to explore the object first and then the museum message and refer it to your own experience and then to interpret the values promoted by the museum. In this way gives you the opportunity to look from many perspectives on the issue of meters illness, loss, grief, helps in recovering a sense of dignity, respect and a positive sense of defining their identity. The subject as part of this therapy is a source of remembrance and telling the history of life. John Mack (2003) even claims that the object is a reservoir or an absorber of memory, and Allan Paivio (1986) shows that you are connected. This property has not only a long time, but short-term memory, and refer to both visual memory, and verbal and sometimes, as the authors note *Enhancing Cancer patient Well-Being With a Nonpharmacologica, Heritage-Focused Intervention* (Thomson, Ander, Menon, Lanceley, Chatterjee 2012), also refers to sensory memory. As writes Constance Classen (2007), an object in a museum can be a medical tool. By giving meanings, it intervenes in the everyday life and identity of the visitor.

In reference to space or exhibits - people involved in the process choose a *museum* or place to help them express themselves, where they feel safe and tell about their choice. The exhibits are used to express your experience, strengthen positive thinking, but also to be a witness to the development of other participants. Educators and therapists provoke further discussion, ask questions, stimulate conversation and prove that the museum is a safe place where everyone can feel accepted, express themselves and their own opinions. Art in the museum in this way makes people more socially open and the space of the museum is a sphere of engaged dialogue. The very fact of initiating or making a dialogue is its therapeutic function. Dialogue as this element, which, according to Silverman, should be stimulated in the museum, especially discussions on so-called sensitive topics that allow the unconscious to become aware, has an important therapeutic function. On the one hand, there is a reference to the concept of conversation, in which conversation is accompanied by mutual acceptance and affirmation of the individual. The philosophy of a conversation by Martin Buber (1992) says that you can express yourself only through a relationship with another person. Only during contact with another person can you experience a real encounter. And by presenting the interlocutors themselves and their views, gain the subjectivity, because in the eyes of the other person one gains the conviction of his being. Buber therefore preached the dialogic principle understood as co-participation, tolerance and *Einander-Zuwenden*. The philosophy of Józef Tischner's dialogue is also close to this principle. Similar correlations could be

multiplied. Each time, the philosophy of dialogue or conversation will show the exchange of information, meeting with other people as significant in shaping the subjectivity and identity of the individual. And it is the sense of this specificity that has a therapeutic function here. The mere perception of dialogue - which is the equivalent of health - allows internal democracy, because it leads to talk and exchange. In contrast, the monologue is identified with the disease, because it relies only on referring to a given form of the "I.I." Dialogue here is a conversation taking place at the structural, social and cultural levels, based on the exchange of views, seeking and understanding sense. It is kind of allegation (Głowiński 1986), and therefore the element of dialogue is opposed to unanimity and authoritarianism, quotes statements and interpretations of others to justify and make their own. It consists of four components: listening, analyzing, synthesizing and explaining. As Jerome Seymour Bruner (2006:43) remarks, dialogue allows you to discover wise and deep things. It enables sharing emotions and thanks to this a participant in dialogue or polylogue becomes involved. His mature attitude allows for a sense of satisfaction in achieving a certain level of skill and / or knowledge. The monologue is therefore connoted with a totalitarian regime or absolute rule. Meanwhile, dialogue leads to creative development, assimilation and reconciliation of the various faces of the "I". Dialogue is primarily a healing opportunity to speak with your own voice. It allows you to develop skills in building new, interpersonal relationships, building a dialogue attitude, co-creating social knowledge from the perspective of many "me", flexible entering into different relationships with other people and saying silent stories (Siodmiak 2008:176). Dialogue is not only understood here as asking questions and answering, but also replication, or the ability to understand and correctly respond to a conversation participant. What's more, it presupposes the existence of a speaking person and a social audience. It is based on the intersubjective opinions that are expressed both by the creator and the recipient of his work. It enables viewing the situation from many perspectives and it is necessary to refer to the interlocutor's opinion.

Conclusion

Philippa Winn (2001) proves that the museum allows you to look at life in a broader context and becomes a place of inspiration and relief from problems. Telling stories based on exhibits, making them the heroes of a story or telling their stories around objects allows not only for understanding art, combining life with art, but also for solving individual problems. Acts of reminding, for Maurice Halbwachs (2008) can be called the location of memories. The French sociologist, more importantly, also emphasizes that a story that interweaves or uses memories is not just an act of reproduction, but a creative one. And although he was usually critical and he was referring to the theory of another French philosopher, Henri Bergson (2012), in the matter of remembering he was inspired by his idea of remembering as a (re) presentation. He argued that the remembrance is rather an act of evocation, a creative, creative or even performative action. And similarly to those theorists of memory he indicates that the story is ruled by present rules, and this is subordinated to the present quoting past, for the purposes of the present moment the story is constructed.

Activation of these memories, both good and difficult or negative, is often associated with well-being, because it allows for positive reminiscences or purification. David Read Johnson (1987) describing therapy through art, refers primarily to traumatic memories, indicating that their release or disclosure and then sharing them allows one to deal with them. In this way, he proves that every time the memories have the power of *catharsis* (Philips 2008). Art therapy, including painting, sculpture, drawing, but also object therapy, meditation and analysis therapy allows one to get to know oneself in the process of interpretation, creation or narrative about artifact. Communicating your own perception of the world and referring to your own knowledge or experience helps you to better understand yourself and articulate your worldview, introduce yourself. Stimulates personal development as well as self-esteem and self-awareness. In addition, it helps to overcome monotonous and routine. Discussion and an attempt to defend one's own interests reveal what is unconscious, hidden or disregarded. What's more, it allows you to interact and build social relationships.

Bibliography

- Aegyle, E.; Bolton, G. (2005). „Art in the community for potential vulnerable mental health groups”. *Health Education*, 105, 5:340-354.
- Alter Muri, S. (1996). Dali to Beuys: Incorporating art history in art therapy treatment plans”. *Journal of the American Art Therapy Association*, 13,2:102-107.
- Bergson, H. (2012). *Materia i pamięć: o stosunku ciała do ducha*, Kraków: Wydawnictwo vis-à-vis/Etiuda.
- Bruner, J.S. (2006). *Kultura edukacji*, Kraków: Universitas.
- Buber, M. (1992). *Ja i Ty: wybór pism filozoficznych*, Warszawa: Pax.
- Chatterjee, H. (2008). *Touch in Museums. Policy and Practice in Object Handling*, Oxford: Berg Publishers.
- Classen, C. (2007). “Museum Manners: The Sensory Life of the Early Museum”. *The Journal of Social History*, 4 (4): 895–914.

- Głowiński, M. (1986). „O interseksualności”. *Pamiętnik Literacki*, 4: 75-100.
- Halbwachs, M. (2008). *Spoleczne ramy pamieci*, Warszawa: Wydawnictwo Naukowe PWN.
- Johansson, E. (1996). “Attendance at cultural events , reading books or periodicals, and making music or singing in a choir as determinants for survival: Swedish interview Survey of living conditions”. *BMJ Clinical Research*, 313 (7072):1577-1580.
- Johnson, D.R. (1987). “The role of the creative arts therapies in the diagnosis and treatment of psychological trauma”. *The Arts in Psychotherapy*, 14(1): 7-13.
- Konlaan, B.B.; Bygren L.O.; Johansson, S-E. (2000). “Visiting the cinema , concerts , culture or art exhibitions as determinant of survival: a Swedish fourteen-year cohort follow- up”. *Scandinavian Journal of Public Health*, 28 (3):174-178.
- Mack, J. (2003). *The Museum of the Mind: art. An d Memory in World Cultures*, London: The British Museum Press.
- Myers, T. (2009). *Slavoj Žižek*, [in:] *Žižek. Przewodnik Krytyki Politycznej*, ed. Kropiwnicki, M.; Kutyla, J. Warszawa: Wydawnictwo Krytyki Politycznej.
- O’Neil, M. (2010). „Cultural attendance and public mental health - from research to practice”, *Journal of public mental health* , 9, 4:22-29.
- Paivio, A. (1986). *Mental Representations: A Dual-Coding Approach*, New York: Oxford University Press.
- Peacock, K. (2012). “Museum Education and Art Therapy: Exploring an Innovative Partnership”. *Art Therapy. Journal of the American Art Therapy Association*, 29, 3: 133-137.
- Philips, L. (2008) *Reminiscence: Recent Work at the British Museum*. [In:] *Touch in Museums. Policy and Practice in Object Handling*, ed. Chatterjee, H. Oxford: Berg Publishers, 2008.
- Silverman, L.H. (2010). *The Social Work of Museums*, Nowy York: Routledge.
- Silverman, L.H. (2002). *The social work of museums*, London: Routledge.
- Silverman, L.H. (1989). *Johnny Showed Us the Butterflies”: The Museum as a Family Therapy Tool*, [in:] *Museum visits and activities for family life enrichment*, ed. Butler, BN and Sussman, MB. New York: Haworth Press.
- Siodmiak, K. (2008). *Perspektywa dialogowego "ja" w arteterapii*. [In:] *Arteterapia w medycynie i edukacji*, ed. Karolak, W.; Kaczorowska, B. Łódź: Wyższa Szkoła Humanistyczno-Ekonomiczna w Łodzi 2008.
- Thomson, L.J; Ander, E.E.; Menon, U.; Lanceley, L.; Chatterjee, H.J. (2012). “Enhancing Cancer Patient Well-Being With a Nonpharmacological, Heritage-Focused Intervention”. *Journal of Pain and Symptom Management*, 44, 5:731-740.
- Walerich-Szymani, E. (2004). *Godzina aktora. Poszukiwanie utopii w dramaturgii Heinera Müllera*, Kraków: Księgarnia Akademicka.
- Weil, S.E. (1999). “From Being about Something to Being for Somebody: The Ongoing Transformation of the American Museum”. *Daedalus*, 128, 3:229-258.
- Williams, R. (2010). “Honoring the personal response: A strategy for serving the public hunger for connection”. *The Journal of Museum Education*, 35 (1):93-102.
- Winn, Ph. (2001). Arts for health: Art. Therapy at the National Gallery of Australia. 6th National Rural Health Conference Canberra, Australian Capital Territory, 4-7 March 2001, http://www.ruralhealth.org.au/papers/6_G_6_2.pdf (access: 10.05.2018).

The Ordinance Of The Local Government For Multicultural Education In South Korea

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Abstract

This study focuses on multicultural education support policy for migration children in The Republic of South Korea. Migrant children are reluctant to give up their education due to differences in educational opportunities and Korean language skills, and education support is in a state of urgency, and it is necessary to shift to practical support and customized support. This study on the appropriate point suggests the status and improvement direction of the multicultural education in Korea.

Introduction

With steady inflow of foreigners into Korea, foreigners staying in Korea in 2018 account for about 3.9% out of the total population (Monthly statistics of immigration and foreign policy, 2018). Accordingly, in Korea, the interest and policies regarding multicultural society increased. In Korea, laws such as FRAMEWORK ACT ON TREATMENT OF FOREIGNERS RESIDING IN THE REPUBLIC OF KOREA (2007), MULTICULTURAL FAMILIES SUPPORT ACT (2008), ACT ON THE PROTECTION AND PROMOTION OF CULTURAL DIVERSITY (2014), REFUGEE ACT (2016) have been enacted to aid social integration in response to a growing multicultural society. (Korea Ministry of Government Legislation)¹. These laws prescribe policies such as multicultural education that enables migrant children to learn Korean language and to receive support for education, and Korean to understand multicultural society and to accept changes, even though these are not enough. And education related laws such as elementary, middle, and high school laws prescribe institutions for guaranteeing education rights for children of international marriage or migrant children.

In particular, the increase in migrant children affected the interest in multicultural education or mutual cultural education and changes in educational policies. The Korean government came up with various policies of multicultural understanding education and promotion for guaranteeing education rights for children of multicultural families and for ensuring that Koreans understand multicultural society and accept changes.

Through these efforts, Korea has institutional foundation for multicultural education. However, regarding institutionalization of multicultural education, rather than central government but local governments implement policies in earnest. Even though Korea has not developed local autonomous governing system like Europe or the United States, but has strong local autonomous governing principle of education. Accordingly, multicultural education is also being implemented in local governments. To that end, 17 local governments has enacted and implemented ordinances for multicultural education. This study is aimed at analyzing and evaluating these multicultural education ordinances.

Emergence and major contents of ordinances for multicultural education support in Korea

In Korea, with the increase of immigrants, migrant children are also increasing. However, children of marriage migrants outnumber children of migrant workers. Migrant workers have to return to their own countries in principle after three years in accordance with short term circulation system, and they are not allowed to bring their families. On the other hand, as marriage migrants get married with Koreans and give birth to children, the number of migrant children rapidly increased. According to statistics of the year 2017 (National Statistical Office, 2017), the number of multicultural families attending elementary, middle, and high schools² about 110,000, accounting for 1.9% of the entire students. The number does not include children who are born in foreign countries and move to Korea with their parents.

As children of multicultural family have Korean nationality, they are not discriminated legally in terms of education. However, they may be late in learning Korean language and special curriculum is required. Besides, in

¹ www.law.go.kr

² In Korea, when immigrants of marriage marry and make households, they are called multicultural family, and the children born to them have Korean nationality and area called children of multicultural family.

the case of children who come to Korea with their parents such as children of compatriots of foreign nationality, remarriage households of international marriage, and migrant workers, they tend to give up their studies because of differences in educational chances and Korean abilities. Therefore, educational support for these migrant children is desperately needed. Even though the Korean central government comes up with measures, local education offices need to come up with policies for education support for them. In other words, in terms of education for migrant workers, not principled regulations such as discrimination prohibition, but change to practical support and customized support is needed at this time.

In the meantime, Korea's central government emphasizes multicultural education for all students and ordinary citizens. Legal grounds for multicultural education in Korea are prescribed mainly in multicultural family support law, not in laws regarding education. These laws especially prescribe "The State and local governments shall take measures, such as education and advocacy activities for understanding diverse cultures, necessary for preventing social discrimination and prejudice against multicultural families and for encouraging members of society to acknowledge and respect the cultural diversity." And they also prescribe education of understanding multicultural family at school and training for multicultural understanding of teachers. In addition, the Ministry of Education, Science and Technology announced 『Measure to advance education for multicultural students』 in 2012, and the measure emphasizes multicultural preparatory school and establishment of Korean as Second Language course(KSL), expansion of dual language instructor, and fostering global leading schools. However, the multicultural education of the central government focuses educational rights for migrant children and understanding about multicultural family.

Accordingly, local autonomous governments enacted ordinances for supporting multicultural education. The first ordinance for multicultural education was made in 2012, and as of 2018, all of 17 upper (metropolitan) local governments enhanced this ordinance. Educational policies regarding key multicultural prescribed in ordinances supporting multicultural include multicultural preparatory school for all students, Korean language course(KSL), emphasis on multicultural education, multicultural focus school, expansion of dual language instructors, training for multicultural education of teachers, and establishment of multicultural education support center.

Multiculture preparatory school has programs to help students who come to Korea midway through or children of foreigner households. Centering on schools with certain number of children of migrant background, Korean as Second Language(KSL) classes are operated. In multicultural focus schools, multicultural sensitivity education is conducted for all students. Through training for teachers, teachers' competency in multicultural and expertise are enhanced. In addition, multicultural education center are established in local communities to support migrant children's entering into public education and adaptation. Rather than laws or policies of the central government, ordinances of local governments are thought to expand the multicultural education in line with the essential concept of multicultural education.

Evaluation and improvement direction of multicultural education support ordinance

It is encouraging that local governments expand multicultural education in accordance with multicultural education support ordinance. Multiculture preparatory schools are often favored by migrant children and they enter such schools. However, there are counterarguments about migrant children's going to multicultural preparatory schools. Because some think that the essential concept of multicultural education of integrated education is damaged. And it is pointed that in spite of multicultural education, there are perspective focusing on pure blood. These limitations are analyzed and improvement measures are suggested.

First, there are limitations on subjects of policies. Korea's laws do not use the term of migrant children, but use the term of children of multicultural family which premises the qualification for legal residing. For this reason, Korea's multicultural education tends to be confined to children of multicultural family. There is still perception that at least one of parents needs to be Korean, emphasizing the importance of pure blood. Therefore, there are risks of education's vacuum regarding children of foreign nationality(children who come to Korea midway through, refugees included) or unregistered children. Admittedly, compared with the past, educational discrimination for children who come to Korea midway through, migrant children of foreign nationality, and unregistered migrant children is decreasing, but education for them is not institutionally guaranteed. Rather than the concept of children of multicultural family, the concept of migrant children needs to be introduced.

Second, special programs for regions where migrant children are concentrated are needed. In other words, ordinances or multicultural education policies reflecting regional characteristics are needed. As Korea has strong characteristics of centralized authoritarian rule, the authorities of local autonomous governments are weak. For this reason, ordinances supporting multicultural education also fail to reflect regional characteristics and are composed of similar contents. However, there could be differences in the number of migrant children or regional characteristics, contents of ordinances supporting multicultural education need to reflect regional characteristics. For example, in the case of the regions where there are many migrant children, measures could be considered to designate the regions as special district for multicultural international school, or to strengthen dual language education.

Third, preparation measures need to be made for the students who drop out halfway through. In particular, children

who come to Korea midway through go to school with no experience in Korean language and Korean culture, and experience maladjustment, identity crisis, and psychological withering. Admittedly, for resolving these problems, preparatory schools exist to help them adjust to regular schools. However, as preparatory schools are conducted centering on elementary schools, proper preparatory schools need to be made for middle and high schools (Central multicultural education Center Policy School Business Explanation Database, 2017). In addition, for those who drop out midway through occupational education needs to be provided.

Fourth, multicultural education within school and outside of school need to be harmonized. For facilitating multicultural education and practical operation, the network role regional multicultural education center is emphasized. multicultural education outside of school is expected to conduct multicultural education not only for migrant children, but also for ordinary citizens.

Fifth, strengthening competency of teachers for multicultural education requires training of teachers. Training of teachers is stipulated in some ordinances or included in multicultural education implementation plan. However, even in the case of training of teachers, the focus tends to be on multicultural of multicultural family phenomenon and multicultural education has strong characteristics of education reform. Therefore, training of teachers needs to emphasize reform related with teaching and learning and teachers' multicultural competency and multicultural sensitivity.

Lastly, in line with the essential meaning of multicultural education, multicultural education for all students needs to be facilitated further. To that end, education to understand various environments and cultural background of minorities need to come first, and multicultural education to respect human rights and cultural characteristics of minorities. In addition, in Korea's current ordinances supporting multicultural education, reasons for prohibiting discrimination and concept of multicultural education need to be actively stipulated and multicultural education contents need to be expanded on educational sites (Sangwoo Chong & Hyunmin Kang, 2015:15). In other words, it should not be confined to 'understanding' education regarding 'multicultural family', but it needs to be changed to multicultural personality education based on prohibiting prejudice and discrimination, and cultural diversity.

Conclusions

Facilitating multicultural education pursues multicultural education for all students rather than being the education for social composition of minorities and emphasizes multicultural human rights education to understand various cultural characteristics. In addition, for functions of operating practical autonomous governance laws, under the policies and institutions of central government, understanding and spreading customized support and multicultural are needed. They need to be regarded as approaches to foster global talents who prosper in the internationalization era, not beneficiaries, and practical efforts based on institutional foundation between central government and local autonomous governments are required.

References

- Banks, J. A., & Banks, C. A. M. (2008). *Multicultural education: Issues and perspectives* (6th edition). John Wiley & Sons.
- Bennett, C. I. (1999). *Comprehensive Multicultural Education: Theory and Practice* (4th edition). Boston, MA: Pearson Education Inc.
- Sangwoo Chong & Hyunmin Kang (2015). *Exploring Concept and Directivity of Human Right and Multicultural Education*. *Journal of Human Rights & Law-related Education*, 8(3), 1~23.
- Salili, F., & Hoosain, R. (2001). *Multicultural Education: Issues, Policies, and Practices*. Greenwich, CT: Information Age Publishing.
- Sleeter, C. E., & Grant, C. A. (1994). *Making Choices for Multicultural Education: Five approaches to Race, Class, and Gender*. New York, NY: Macmillan Press.
- National Center for Multi-cultural Education (2017). 『Multicultural prep school business guide』.
- National Center for Multi-cultural Education (2017). 『Multicultural education policy school project presentation book - Multicultural prep school』.
- Educational Statistics Annual (2018).
- National Statistical Office (2017).
- Korea Immigration Service (2018). 『Monthly statistics of immigration and foreign policy』.
- Ministry of Government Legislation (2018). <http://www.law.go.kr>

The Paradox Of The Hungarian Frame Curricula In Informatics

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Abstract

Analysing the Hungarian frame curricula in Informatics, along with the number of classes and years dedicated to the subject, several contradictions were revealed. Informatics as a school subject is compulsory in grades 6–10, with one class a week. In special programs, classes are available for younger students and/or with a higher number of classes. However, regardless of the number of classes and/or years assigned to the subject, similar knowledge contents are required.

We have found that the paradox of the frame curricula is that it was intended to be tool, interface, and environment independent, but, ultimately, turned out to be over-generated. Furthermore, the curricula do not focus on fundamental, transferable skills, abilities, and knowledge. Instead, we revealed that it contains mostly vague expressions which do not provide enough of a guide for teachers to develop lessons with relevant content. Beyond that, it is not evident how the curriculum supports the development of computational thinking, algorithmic skills and the computer supported problem-solving abilities of students, which should be the primary concern of these documents. Furthermore, huge gaps are detectable between the different areas of Informatics, and between Informatics and other subjects, and there is no clear presentation of how they are connected, and how this knowledge can be transferred to real world problem-solving.

Our preliminary aim was to reveal and describe the paradox within the curricula. We further plan to test the students' knowledge according to the requirements of these documents, and find out how the different communities, schools, age groups, and teachers assign meaning to the over-generated expressions of the frame curricula. For this purpose, we created a test which aims to cover the most important aspects of the Hungarian frame curricula in Informatics, focusing on the students' fundamental ICT skills, including but not limited to file operations, algorithm analysis and decoding, and text and data handling. In our current work we also present some of the questions and tasks of the test and provide details on how they are connected to the curriculum, to its dedicated areas, and to other school subjects.

Keywords: *Curriculum analysis, Informatics, algorithmic skills, computational thinking, computer problem-solving*

Introduction

Several research projects on the subject have revealed that the extremely high attrition rate in tertiary studies in Informatics is primarily rooted in the students' low level of computation thinking skills, their unawareness of the requirements of these courses, and their attitude to the subject area (Gombos & Csernoch, 2015; HIS, 2007; OECD, 2011; OECD, 2016; Csernoch & Biró, 2017).

Focusing on the students in our close environment – first year students of informatics at the University of Debrecen – the TAaAS project (Testing Algorithmic and Application Skills) revealed that the students' algorithmic, programming, and computer problem-solving skills are much lower than is expected according to university standards (Csernoch et al., 2015) and that the attitudes of students to computer sciences/informatics do not match the real nature of these sciences and the expectations of tertiary studies (Csernoch & Biró, 2017). The authors of the TAaAS projects concluded that that students' difficulties originate in their previous education in primary and high schools.

In addition to analysing the frame curricula, we aim to find out how teachers of Informatics interpret it, what contents and methods they apply in their classes, and how effective these methods are. For this purpose, we are planning to launch a test which aims to cover the most important aspects of the Hungarian Base Curriculum and the frame curricula in Informatics, focusing on the students' fundamental ICT knowledge, including but not limited to file operations, analysing and decoding algorithms, handling text and data, and students' knowledge-transfer and computer problem-solving abilities.

National Core Curriculum

In the 1995 National Core Curriculum a new subject area, “Informatics, computing and library use” (NAT, 1995) was introduced. In the more recent edition of this document released in 2003 (NAT, 2003), digital competence was declared as a key competence, a concept which was reinforced in the 2007 and 2012 National Core Curricula (NAT, 2007; NAT, 2012).

In the National Core Curriculum, digital competence is defined as follows:

“Digital competence embraces the confident and critical use of information society technologies in work, communication, and leisure. It is based on the following skills, [and] activities: recognition, retrieval, evaluation, storage, production, presentation, and exchange of information; as well as communication and networking through the Internet.” (NAT, 2003; NAT, 2007; NAT, 2012).

According to the National Core Curriculum, the use of digital technologies must become more prevalent in primarily and secondary education, which should make learning and teaching more effective; in the meantime, computational thinking should become the fourth basic skill alongside reading, writing, and arithmetic (Wing, 2006). Considering this concept, it is clear that the National Core Curriculum assumes a firm knowledge-transfer between the different subjects within informatics and encourages computer supported real-world problem-solving in other subjects.

However, we must bear in mind that it is a misconception (Kirschner and Bruyckere, 2017) that digital natives, i.e. the Z-generation (Prensky, 2001), do not need to study informatics because their everyday lives are accompanied by digital tools from birth. Indeed, it has been proved that every child needs to develop computer thinking skills, regardless of their year of birth (Kirschner & Bruyckere, 2017; Csernoch et al., 2018).

Implementation – Frame Curricula In Informatics

The official content

In the Hungarian education system children start school at the age of 6-7, and primary education usually lasts 8 years, and is followed by a further 4 years of secondary education. Informatics as a school subject is compulsory in grades 6–10, for one class a week. In special programs, classes are available for younger students and/or with higher number of classes. However, regardless of the number of classes and/or years assigned to the subject, similar knowledge contents are required (Kerettanerv, 2013).

Based on the current frame curricula (Kerettanerv, 2013a; Kerettanerv, 2013b; Kerettanerv, 2013c), digital competence includes the following activities and abilities assigned to primary school students.

Primary school students are supposed to (Kerettanerv, 2013)

- become more motivated to use ICT tools,
- be able to learn text and data management in informatics classes, in other school subjects, and in extracurricular activities,
- use information provided by computers and the Internet, (here, we must mention that we do not agree with the expression “information provided by computers”, since computers are not able to provide anything, and definitely not information),
- be able to create presentations and reports,
- be familiar with the opportunities offered by electronic communication and be aware of their dangers.

High school students, beyond the above requirements, are supposed to (Kerettanerv, 2013):

- be able to create aesthetic documents using word processing, spreadsheet and presentation programs,
- adhere to the ethical principles of communication and use of information,
- know and take into account copyright and legal principles pertaining to users.

The practice

The analysis of the frame curricula revealed that they are too ambitious, given the low number of classes, so it is impossible to teach the required contents to an appropriate depth. This is evidenced by the two information technology frame curricula currently available, which do not differ in their contents but only in the number of classes assigned to the subject (obligatory: Informatika kerettanerv, 2013b; Informatika kerettanerv, 2013d, optional: Informatika kerettanerv, 2013a; Informatika kerettanerv, 2013c; Informatika kerettanerv, 2013e). Consequently, teachers have their own ideas of what the terms of the curricula mean, but there is no consensus. Everyone teaches whatever they think is correct and acceptable: different subjects and different content, using different approaches – and not necessary those that have been proved to be effective and efficient. In general, there is too much freedom for teachers of informatics. On the other hand, it is important to note that, due to the absence

of organized post-graduate teacher education, there is no evidence that teachers are up-to-date, or that they are fully aware of the all required components of TPCK (Koehler & Mishra, 2009; Koehler, 2012) and of the National Core Curriculum and the frame curricula. To find evidence of how teachers implement the current frame curricula in informatics and how they prepare their students in accordance with the required contents, we administered a questionnaire in grades 7–10, accompanied by a questionnaire for the teachers of the students involved.

Examples Of Over-Generalized Expressions

In the following, samples (Tables 1, 2 and 3) are presented from the frame curricula in informatics to demonstrate its over-generalization, its vague and ambiguous expressions, the lack of the skills and competences it is meant to develop, and also of the background knowledge which is required to teach the contents effectively.

Expressions of the frame curricula	Research questions
create short documents	How long are short documents?
create bigger documents	How long are bigger documents?
create smaller documents	What is the difference between smaller and shorter documents?
create webpages	What elements should the webpage contain? What kind of webpage editor should be used? What level of webpage design is required?
basics of web design	What does the word “basics” mean?
different objects inserted into documents	What kind of objects? How many objects?

Table 1: Expressions from the requirements of the frame curriculum in the “Creating digital texts and audio-visual documents” area (left), and our questions, which draw attention to the ambiguous expressions.

Expressions of the frame curricula	Research questions
build algorithms to solve a problem	Which problem? What kinds of problem? What is the complexity of the algorithm?
create simple algorithms	What is a “simple” algorithm?
write simple programs	What does “simple” program mean? Which language(s) and which structures can be used?
implement the algorithm-solution of simple problems	What does a “simple” task look like? What does “algorithm-solution” mean? What kind of implementation is required, and in what programming language(s)?

Table 2: Expressions from the requirements of the frame curriculum in the “Problem solving with informatics tools and methods” area (left), and our questions, which draw attention to the ambiguous expressions.

Expressions of the frame curricula	Research questions
use functions	Which functions? All the 600 functions of MS Excel? All the functions of a programming language? What does “use” mean? Call functions?
edit formulas	Which formulas? What kind of formulas? What kind of operators? Call functions as well?
upload database	Where do we have to upload databases to? How should we upload databases? What kind of databases? Why do we have to upload databases?
compound interest, calculate the area, the surface, the volume of objects, relative frequency, probability, logarithmic function	The logarithm function is taught in class 11 in mathematics, and this expression is in the elementary school curriculum. When are relative frequency and probability taught in maths classes? The area of what? The surface and volume of what objects?

Table 3: Expressions from the requirements of the frame curriculum in the “Data management, data processing, information retrieval” area (left), and our questions, which draw attention to the ambiguous expressions.

We also must draw attention to the language of the frame curricula. We have not edited the expressions presented in Tables 1–3 in such a way as to present them in a bad light: they are given in their original forms. This means that the frame curricula contain ambiguous expressions rather than complete sentences, which makes understanding even more difficult.

Magic Words

There are words in the documents which we call “magic words” due to their high frequency and ambiguity, which also make the curriculum obscure. Some of these terms are included in the following tables (Tables 4 and 5).

basic operators	basic use
basic knowledge	basic relationships
basic mathematical operations	basic concepts
basic treatment	basic utility type
basic functions	basic service
basic instructions	basic elements

Table 4: A selection of expressions containing the magic word “basic”.

simple exercises	simple database development
simple development system	simple application programs
simple activities	simple floor plans
simple processes	simple spreadsheet operations
writing simple algorithms	simple models
simple events	simple user software

Table 5: A selection of expressions containing the magic word “simple”.

We compared the frame curricula of informatics to the frame curricula of the other subjects that students begin to study at a similar age, and also to finish at a similar age, and where, moreover, there is a subject relationship between informatics and these subjects. Based on these criteria the choice fell upon physics and chemistry. Students begin to study physics in class 7 and finish in class 11. Except for eight grade, they have two classes a week every year. Chemistry is started in the seventh grade with one hour per week and is studied for two hours a week over the next three years.

The following tables (Tables 6 and 7) show the frequency of “magic words” in the frame curricula for physics, chemistry, and informatics. The word “basic” occurs 21 times in the primary school curriculum for informatics, while in the secondary school curriculum for the same subject it occurs 13 times (Table 6, **Hiba! A hivatkozási forrás nem található.**).

basic	number of classes	frequency
physics	2+1+2+2+2	9+31
chemistry	1+2+2+2	17+10
informatics	1+1+1+1+1	21+13

Table 6: The frequency of the word “basic” in the frame curricula for physics, chemistry, and informatics subjects.

The word “basic” occurs in physics 40 times, and in chemistry 27 times. The word “basic” occurs 21 times in the primary school curriculum for informatics, while in the secondary school curriculum for the same object it occurs 13 times. (Table 6, Figure 1) The word “basic” occurs 21 times in the primary school curriculum for informatics, while in the secondary school curriculum for the same subject it occurs 13 times (Table 6, **Hiba! A hivatkozási forrás nem található.**).

All in all, these numbers are similar to the number for the informatics curricula (34 terms), but on average (frequency/hours) their relative frequency is highest in informatics (**Hiba! A hivatkozási forrás nem található.**).

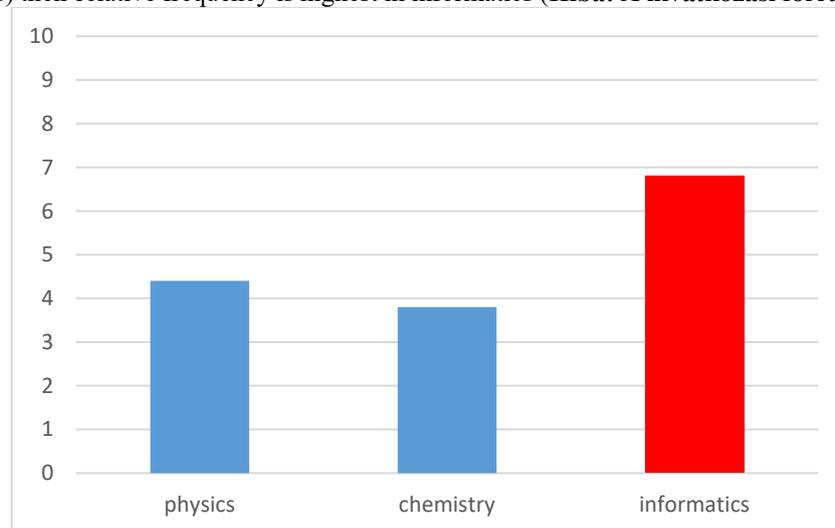


Figure 1: The frequency of the word “basic” in the frame curricula for physics, chemistry, and informatics divided by the number of classes.

The situation is similar with other words. The word “simple” occurs 18 times in the primary and 10 times in the secondary school frame curricula in informatics (Tables 7 and 5, Figure 2). As with the frequency of the word “basic”, the word “simple” occurs more frequently in informatics than in the other subjects (Table 7, Figure 2).

simple	number of classes	frequency
physics	2+1+2+2+2	7+29
chemistry	1+2+2+2	9+8
informatics	1+1+1+1+1	18+10

Table 7: The frequency of the word “simple” in the frame curricula for physics, chemistry, and informatics subjects.

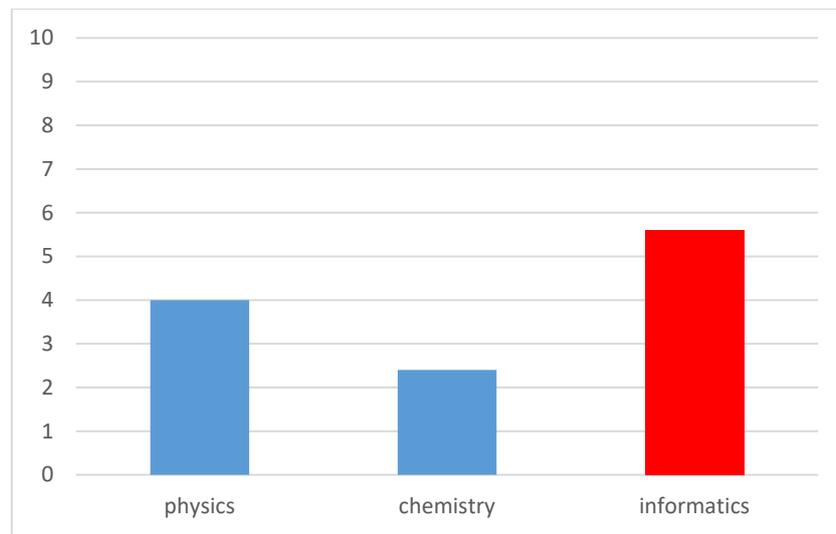


Figure 2: The frequency of the word “simple” in the frame curricula for physics, chemistry, and informatics divided by the number of classes.

Testing Computational Thinking Skills

Our preliminary aim was to reveal and draw attention to the paradox of the Hungarian frame curricula. We further planned to test the students’ knowledge according to the requirements of these documents, and find out how the different communities, schools, age groups, and teachers assign meaning to the over-generated expressions. For this purpose, we completed a test which aims to cover the most important aspects of the Hungarian frame curricula in informatics, focusing on the students’ fundamental ICT skills, which includes but is not limited to file operations, text and data management, and analysing and decoding algorithms. In our current work we also present some of the questions and tasks of the test and provide details on how they are connected to the curriculum, to its dedicated areas, and to other school subjects.

Task A: Data type recognition and knowledge-transfer

The following problems are presented in a Hungarian (European) interface. What data types are in each column starting from row 2? (multiple answers are accepted)

	A	B	C	D
1	Username	Uploads	Subs	Views
2	VamosART	484	1,107,555	226,195,766
3	Videómánia	338	833,23	254,545,702
4	PamKutya	120	809,866	223,441,355
5	LetsGoMartin	176	725,638	162,798,559
6	TheVR	1,062	592,675	213,550,948
7	luckeY	1,183	561,13	150,341,428
8	Peter Gergely	100	548,241	79,713,757
9	Scribble Netty	159	546,049	74,234,471
248	Szilvaglam	87	61,899	3,918,538
249	rance flow	524	61,863	53,275,385
250	KIS GRÓFO (official)	9	61,65	30,712,031
251	KODIAK	736	61,467	14,599,194

	Integer	Real	Text	Logical	Date	None
Column A	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Column B	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Column C	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Column D	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Figure 3: The sample table to test how students recognize the different data types in the presented table.

- How many rows (records) are in the table?
- The largest number in column B is:
- The smallest number in column B is:
- What does the following formula do? `{=SUM(IF(LEFT(A2:A251)="L",1))}`
-

Figure 4: Questions connected to the sample table in **Figure 3** to test whether students consciously selected the data types of the columns presented, or only did so by chance.

The problems presented and tested in Figures 3 and 4 are rooted in the different semantics of the comma in the different languages. The table is downloaded from the webpage entitled “Top 250 YouTubers Channels in Hungary” (YouTubers 2018; Figure 5), where the country can be selected, and the content is adjusted to this selection. However, the syntax of the selected language is ignored, and the English thousand separator character, the comma, is in use in the downloaded data table regardless of the language of the selected country. By opening this file in Hungarian spreadsheets – and in most European languages – the comma is translated as the decimal character, and the whole numbers consisting of one comma are converted into real numbers (Figure 3 cells B6 and B7, C3–C251), or in the case of two commas the whole numbers become strings (Figure 3 cells C2 and D2–D251) (Table 8).

Rank	Grade	Username	Uploads	Subs	Video Views
1st	A	 LetsGoMartin - Nursery Rhymes	194	2,050,447	493,359,935
2nd	B+	 REAL TRILL MUSIC	372	328,644	263,907,715
3rd	B+	 KerekMese	143	353,603	662,791,261
4th	B	 #MISSHMUSIC	124	340,360	201,745,398

Figure 5: The Hungarian version of the YouTubers using the comma as the thousand separator character.

In Task A, the focus is on the recognition of data types in spreadsheets and the correct/incorrect use of thousand separator and decimal characters, as well as the way knowledge about different data types can be transferred to further studies in database management and programming. However, we have to be aware of another aspect of knowledge-transfer, where the syntax of numbers – knowledge gained in grammar and/or language classes – is brought into informatics. In this chain of knowledge-transfer, spreadsheets serve as a link between natural and artificial computer related languages.

One further aspect of the table presented in Task A must be mentioned. Spreadsheet management is usually – with only a few exceptions (Gross et al., 2013; Csernoch, 2014) – taught without content, focusing only on the tools of the interface (Csernoch, 2017), although “...authentic tables contain real data whose content can be selected in accordance with the students’ interest, and as such can be highly motivating and easily converted into real world situations. ... Consequently, authentic tables can provide data which motivate students to use spreadsheets (Gross et al., 2013; Csernoch, 2014). Research has clearly proved that one of the reasons for failure when teaching spreadsheets is the decontextualized and technocentric teaching methods.” (Csernoch, 2017; Csernoch and Biró, 2018).

Knowledge-transfer items of Task A

- syntax of natural languages
- semantics of the comma
- data types: programming
- data types: database management
- content

Solution

Data column	Data types
Column A	text: (A2:A9) and (A248:A251)
Column B	integer: (B2:B5), (B8:B9), and (B248:B251) real: (B2:B7)
Column C	real: (C3:C251) text: C2
Column D	text: (D2:D251)

Table 8: The data types of the cells presented in the test (Figure 3).

Table 8 shows the data types of the columns presented in the test. There are hidden rows in the table, so altogether the table holds 251 rows, but the first row is reserved for the field names, so the table has 250 data records. The largest number presented in the sample in Column B is 736, while the smallest number in column B is 1,062 (1.062 in English terminology).

As is mentioned above, in most European languages the decimal character and the thousand separator are different from English language usage. The comma is used as the decimal character in European languages but as the thousand separator character in English. In English the dot is the decimal separator character. In European languages the space is the thousand separator character, while in the digital world the non-breaking space is a

better choice (Bujdosó & Csernoch, 2014; Csernoch, 2017). Awareness of these different usages is important when deciding what data types and values are contained in each column of spreadsheets.

If students know the different data types in spreadsheet management, they can use this knowledge later on in other environments, such as database management and/or programming. The reverse of this statement is also true. We usually teach spreadsheets before other interfaces which handle data, because spreadsheet interfaces are easier to handle and functional languages have been proved to be more effective as the first text-based programming language than database management or programming (Booth, 1992). Furthermore, MS Excel adjusts data according to the recognized data type: strings on the left side of the cell, numbers on the right side, while logical values are centred, so data types are clear in each cell. Even the unintentionally different types in a field are easier to reveal with this visualisation. However, (1) we must be aware of automated data recognition in spreadsheets, because not all the data are recognized in accordance with our original intention (for example see Figure 3) and (2) we have to learn how to read this visualisation. The results of the test can prove whether students of the Z-generation (Prensky, 2001) are born with this knowledge or not, and how these students can read non-text-based data and access information based on visual representation.

The formula in the last question (Figure 4) counts the number of users starting with the letter l or L. The array formula presented in the test is a three-level function, consisting of LEFT(), IF(), and SUM() functions, in the order of execution.

Knowledge-transfer items of the array formula of Task A

- spreadsheet: LEFT(), IF(), and SUM() functions
- mathematics: concept of function
- mathematics: n-ary and multilevel functions (not taught in normal maths classes in Hungary)
- programming: calling functions
- programming: writing functions
- programming: decoding
- programming: string constant
- programming: condition
- spreadsheet: condition
- spreadsheet: evaluating array formulas

We must also mention that the same result can be reached by using the built-in COUNTIF() function. However, this function has serious restrictions, one of which is that the function does not except embedded functions in its condition (Csernoch, 2014). Consequently, to solve this problem with the COUNTIF() function we must apply another concept, namely the use of the * character, which requires further transferable knowledge. The solution to the counting problem of Task A is the following: =COUNTIF(A2:A251,"L*"); however, with this solution we do not have access to the algorithm of the problem.

One further advantage of using multilevel array formulas is that their algorithms are transferable to similar problems (Csernoch, 2014) within the frame of Sprego and/or further studies in programming. Table 9 shows the algorithm of the conditional counting problem which can be coded with a three-level array formula.

1.	<i>Input:</i> string Calculating the first character of the string. <i>Output:</i> the first character the string
2.	<i>Input:</i> the first character the string and l/L Asking a yes/no question: Is the returned character of the previous step equal to l or L? <i>Output:</i> a vector of True and False values
3.	<i>Input:</i> a vector of True False values If yes, the record is marked with 1. If no, the record is ignored. <i>Output:</i> a vector of 1 and False values
4.	<i>Input:</i> a vector of 1 and False values Summing up the number of 1s. <i>Output:</i> a whole number

Table 9: Algorithm of the conditional counting problem solved with the array formula in Task A.

Computational Thinking – Task B

What happens when you double click on a document file (e.g.: zz.jpg, zz.html, zz.ods, zz.xls)?



Figure 6: Task B tests how familiar the students are with the algorithm of opening document files.

The question in Task B is whether the students can explain the algorithm which is executed between a double click and the opening of the selected document file. This is the algorithm which is carried out numerous times every day, but most of the time we do not give any thought to what happens between the two stages.

Knowledge-transfer items of Task B

- data file vs. program file
- data file vs. document file
- double click
- file extension
- associate program
- run a program
- open a data file

Algorithm

In the process of opening a document file with a double click, the recognition of agents plays a crucial role. The double-click is carried out by users, and after this the operating system takes control of all the steps of the algorithm.

We have to note here that the definition of the document file itself ensures that an association is already established between the file extension and a program, which is not obvious for most of the users.

agent	action
user	double click
operating system	checking file extension
	checking associated program
	starting the associated program
	opening the data file (document file)

Table 10: The agents and the steps of the algorithm of Task B.

Computer Problem Solving – School Subjects – Task C

In Task C the problem presented is borrowed from a French maths class. However, this problem is language and country-independent, so we decided to include it in the test. Furthermore, we are convinced that the introduction of pseudo-codes in maths classes greatly supports the development of knowledge-transfer skills between maths and informatics and opens up novel approaches in maths problem-solving (Wolfram, 2010 and 2015).

What does the following algorithm do?

```

A, B, C
If A2=B2+C2 or B2=A2+C2 or C2=A2+B2
  then "yes"
  else "no"
End if
    
```

Figure 7: A maths problem – Pythagoras’ theorem – presented in a pseudo-code.

Knowledge-transfer items of Task C

- mathematics: Pythagoras’ theorem

- programming: concept of variables
- programming: a conditional statement
- programming and maths: the OR logical operator

Computer Problem Solving – School Subjects – Task D

In Task D language problems were presented in a digital environment. The printed version of a sample text was selected to test the students' knowledge of the position of space characters, and the use of quotation and punctuation marks. Although the language of the sample text is Hungarian, some of the syntactic errors are obvious even to those who are not familiar with this unique language: the different face of characters substituting the quotation marks, the space characters left of the commas, the inner space on the right hand side of the opening parentheses, and the missing full stop at the end of the sentences (at the end of line 2).

Find the spelling errors on the sample. How many errors did you find? Circle the appropriate number.

A gyermekek·kitárt·karral·a repülő·méhecskét·utánozzák·, méhecske·hangját·hangoztatják·:·“z”·szaladgálnak·,·ha·leoltjuk·a·villanyt·,·leszállnak·virágport·gyűjteni·(·leguggolnak)·Felkapcsoljuk·a·villanyt,·s·folytatódik·tovább·a·játék.¶

0 1 2 3 4 5 6 more

Figure 8: Language problems presented in a digital environment.

Knowledge-transfer items of Task C – grammar

- punctuation mark: the comma
- punctuation mark: the full stop
- quotation marks
- parentheses

Summary

Previous research clearly states that one of the reasons for the high attrition rates in tertiary studies in Computer sciences/Informatics is rooted in the insufficient knowledge-base and the inappropriate attitude of students arriving from high schools. Furthermore, the different expectations students have of secondary and tertiary education might also be a source of this discrepancy.

To reveal how students are prepared for tertiary studies in informatics, and what computer related skills, abilities, and competencies are focused on in primary and secondary education in general, we launched a project to analyse the National Core Curriculum and the frame curricula in informatics. The project consists of two major subsections. The first phase is a thorough analysis and comparison of the documents mentioned above, in order to form conclusions regarding their contents. In the second phase, based on the findings of the first, we composed a test for students of grades 7–10 and for their teachers. The aims of the testing are to reveal (1) how the contents of the frame curricula can be implemented in classrooms, (2) the level of the students' computational thinking skills, and their computer problem-solving and knowledge-transfer abilities, (3) and the common misconceptions currently circulating.

Our analyses lead us to the paradox of the frame curricula in informatics. On the one hand, the curricula was intended to be tool, interface, and language independent, a concept which, in general terms, serves the students' interests. On the other hand, we encountered over-generalization in the form of vague expressions, non-specified contents which allowed different interpretations, tool-specific requirements, unconnected subjects within the discipline, and non-specified connections to other school subjects. This latter approach serves neither teachers nor students.

References

- Booth, S. (1992) Learning to program: A phenomenographic perspective. Gothenburg, Sweden: Acta Universitatis Gothoburgensis.
- Bujdosó, Gy. & Csernoch, M. 2014. Digital Literacy, Digital Language. In Hungarian: Digitális írástudás, digitális nyelvhelyesség. Tudományos és Műszaki Tájékoztatás 61:(10), 1–10.
- Csernoch, M. & Biró, P. (2017). First year students' attitude to computer problem solving. In: IEEE 8th International Conference on Cognitive InfoCommunications: CogInfoCom. Debrecen, Piscataway (NJ): IEEE Computer Society, pp. 225-230.

- Csernoch, M. (2014), Programming with Spreadsheet Functions: Sprego, In Hungarian, Programozás táblázatkezelő függvényekkel – Sprego, Műszaki Könyvkiadó, Budapest.
- Csernoch, M. (2017), “Thinking Fast and Slow in Computer Problem Solving”, Journal of Software Engineering and Applications. Vol.10 No.01 (2017), Article ID: 73749, 30 pages 10.4236/jsea.2017.101002
- Csernoch, M. and Biró, P. (2018). Edu-Edition Spreadsheet Competency Framework. Proceedings of the EuSpRIG 2017 Conference “Spreadsheet Risk Management” ISBN : 978-1-905404-54-4 Copyright © 2017, EuSpRIG European Spreadsheet Risks Interest Group (www.eusprig.org) & the Author(s). Retrieved 15. 07. 2018 from <https://arxiv.org/ftp/arxiv/papers/1802/1802.00496.pdf>
- Csernoch, M., Biró, P., Máth, J. & Abari, K. (2015). Testing Algorithmic Skills in Traditional and Non-Traditional Programming Environments. Informatics in Education: an international journal 14: (2) pp. 175–197.
- Gombos, E. & Csernoch, M. (2015). Knowledge and Result. In: Mafalda Carmo (eds.) END 2015: International conference on education and new developments: Proceedings. 2015.06.27-2015.06.29. Lisbon: World Institute for Advanced Research and Science, pp. 44-48.
- Gross, D., Akaiwa, F., and Nordquist, K. (2013) Succeeding in Business with Microsoft Excel 2013: A Problem-Solving Approach (New Perspectives). Cengage Learning.
- HIS (2007). HIS Magazin Studie. Retrieved May 17, 2018 from <http://www.wiwi-treff.de/home/index.php?mainkatid=1&ukatid=18&sid=18&artikelid=6509&pagenr=0>
- Informatika kerettanterv (2013a) INFORMATIKA. 1–4. évfolyam. Szabadon választható tantárgyak 1.3.3. Dow Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/01_melleklet_1-4/1.3.3_informat_1-4.doc.
- Informatika kerettanterv (2013b) INFORMATIKA. 5–8. évfolyam. Kötelező tantárgyak 2.2.15 Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/02_melleklet_5-8/2.2.15_informat_5-8.doc.
- Informatika kerettanterv (2013c) INFORMATIKA. 5–8. évfolyam. Emelt óraszámú kerettantervek 2.3.2. Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/02_melleklet_5-8/2.3.2_informat_5-8.doc.
- Informatika kerettanterv (2013d) INFORMATIKA. 9–12. évfolyam. Kötelező tantárgyak 3.2.16. Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/03_melleklet_9-12/3.2.16_informat_9-12.doc.
- Informatika kerettanterv (2013e) INFORMATIKA. 9–12. évfolyam. Emelt óraszámú kerettantervek 3.3.6. Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/03_melleklet_9-12/3.3.6_informat_emelt_9-12_u.docx.
- Kerettantervek (2009) Az oktatási és kulturális miniszter 2/2008. (II. 8.) OKM rendelete a kerettantervek kiadásának és jóváhagyásának rendjéről, valamint egyes oktatási jogszabályok módosításáról szóló 17/2004. (V. 20.) OM rendelet módosításáról. Magyar Közlöny. 20. szám II. kötet. 2008. február 8., Budapest.
- Kerettantervek (2013a) Kerettanterv az általános iskola 1-4. évfolyamára. Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/01_melleklet_1-4/index_alt_isk_also.html.
- Kerettantervek (2013b) Kerettanterv az általános iskola 5-8. évfolyamára. Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/02_melleklet_5-8/index_alt_isk_felso.html.
- Kerettantervek (2013c) Kerettanterv a gimnáziumok 9-12. évfolyama számára. Retrieved 10.07.2018, from http://kerettanterv.ofi.hu/03_melleklet_9-12/index_4_gimn.html.
- Kirschner, P. A. & De Bruyckere, P. (2017) “The myths of the digital native and the multitasker.” Teaching and Teacher Education. 67 (2017), pp. 135–142.
- Koehler, M. & Mishra, P. (2009) What Is Technological Pedagogical Content Knowledge? Contemporary Issues in Technology and Teacher Education, 9(1). Retrieved from <http://www.citejournal.org/volume-9/issue-1-09/general/what-is-technological-pedagogical-content-knowledge>.
- Koehler, M. (2012) TPACK Explained. Published on September 24, 2012 by mkoehler. Retrieved July 12, 2018 from <http://matt-koehler.com/tpack2/tpack-explained/>.
- NAT 1995 (1995) 130/1995. (X. 26.) Korm. rendelet a Nemzeti alaptanterv kiadásáról
- NAT 2003 (2003) 243/2003. (XII. 17.) Korm. rendelet a Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról. Retrieved: 2018. 06. 14. http://www.nefmi.gov.hu/letolt/kozokt/nat_070926.pdf
- NAT 2007 (2007) 202/2007 (VII. 31.) Korm. rendelet a Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról szóló 243/2003. (XII. 17.) Korm. rendelet módosításáról.
- NAT 2012 (2012) 110/2012. (VI. 4.) Korm. rendelete a Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról. http://ofi.hu/sites/default/files/attachments/mk_nat_20121.pdf
- OECD (2011): PISA 2009 Results: Students on Line: Digital Technologies and Performance (Volume VI). <http://browse.oecdbookshop.org/oecd/pdfs/free/9811031e.pdf>. <http://dx.doi.org/10.1787/9789264112995-en>. Retrieved: 2014.02.02
- OECD (2016). Oktatási Körkép 2016, OECD mutatók. Összefoglalás magyarul. Retrieved May 17, 2018 from http://www.keepeek.com/Digital-Asset-Management/oecd/education/education-at-a-glance-2016/summary/hungarian_24bbf13e-hu#page2.
- Prensky, M. (2001). “Digital Natives, Digital Immigrants”, From On the Horizon (MCB University Press, Vol. 9 No. 5, October 2001), Retrieved March 21, 2018 from <http://www.marcprensky.com/writing/Prensky%20-%20Digital%20Natives,%20Digital%20Immigrants%20-%20Part1.pdf>.

- Wing, J. M. (2006). Computational thinking. *Communications of the ACM*, 49(3), 33–35. DOI: 10.1145/1118178.1118215
- Wolfram, C. (2010, July 15). Stop Teaching Calculating, Start Teaching Math—Fundamentally Reforming the Math Curriculum. Transcript: Wolfram Technology Conference 2010 Talk. TED Global 2010. Retrieved October 12, 2015, from http://www.computerbasedmath.org/resources/Education_talk_transcript.pdf.
- Wolfram, C. (2015). Evidence: Let's promote not stifle innovation in education. Retrieved October 12, 2015, from <http://www.conradwolfram.com/home/2015/5/21/role-of-evidence-in-education-innovation>.

Sources

- YouTubers (2018) Top 250 YouTubers in Hungary sorted by SB Rank. Retrieved 15. 07. 2018 from <https://socialblade.com/youtube/top/country/hu>.

The Project-Based Learning Approach And Collectivistic Efl Learning: Me Vs We

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Abstract

Learning the English language is a challenging endeavor which requires a collaborative, team-oriented spirit. The belief that learners learn better when they learn together has indeed become a cherished motto of language experts and practitioners. This team-orientedness seems to be a requisite for all English language learners and tutors. In this regard, the project-based learning approach is hailed as a collectivistic, team-specific pedagogical instrument that enhances the “we” rather than the “me” attitude among English learning communities, particularly in the EFL context. Thanks to the implementation of the PBL underlying premises, EFL learners are prone to smoothly develop not only different language skills but also various life skills that can make of them added values to their communities and countries. Within this vein, this paper purports to answer the following set of questions: (1) In what way does PBL favor the “we” learning attitude? (2) Is it true that EFL learners cultivate linguistic and extra linguistic assets through PBL? (3) What constraints impede the adoption of the PBL approach in the EFLT context? The assumption which governs the elaboration of these research questions is that EFL learners are likely to display linguistic shortcomings that could be efficiently fixed up via PBL-bound strategies and techniques.

Key words: *PBL/EFL/teaching/individualistic learning/collectivistic learning/ linguistic skills/ life skills/ linguistic deficiency/ linguistic efficiency/EFLT context.*

Introduction

There seems to be a quasi-universal consensus among language experts and practitioners that teacher-centered learning is doomed to be fruitless and unproductive. Conversely, there apparently is a common scholarly agreement that student-oriented learning/teaching approaches and strategies tend to render the teaching/learning endeavor more meaningful and more purposeful (McKay 2002; Kern 2000; Richards 2006). Accordingly, the use of strategies which foster initiative-taking, responsible peer learning, self-reliance and self-development are hailed as practical pathways for stepping away from the teacher-dominant teaching/learning style. In the English as a Foreign Language Teaching (EFLT) context, there is a persistent need to endorse and apply the tenets of the student-oriented pedagogical methods which stipulate that learners learn better when they are autonomous, self-dependent and stress-free. Instead of focusing on language usage, the emphasis should be put on nurturing language use while putting in place learning environments that favor integrated, collaborative, authentic and life-related pedagogical practices.

Within this scope, project-based learning (PBL) is solicited as a didactic approach which helps learners to cultivate not only language skills but also life skills. Although some might think that it is an approach which is much more suitable and practical in scientific learning domains and environments, it is the purpose of this study to show that PBL is to be used within and across disciplines, namely in EFL learning. Taking the School of Arts and Humanities in Marrakech Morocco as a locus of investigation, this paper shows that the merits of PBL far outweigh its eventual demerits.

Project-Based Learning: Overview

As a theory, project-based learning did not appear from a vacuum. It is indeed a theory that builds on human development theories. Project-based learning finds its roots in the constructivist theory which maintains that every learner enjoys a Zone of Personal Development (ZPD) defined by Vygotsky (1978: 86) as “the distance between the actual developmental level as determined by independent problem solving and the potential of development as determined through problem solving under adult guidance or in collaboration with more capable peers.” A quick scrutiny of Vygotsky’s collectivistic, developmental ZPD notion would be enough to fathom the fact that PBL draws upon previous theories which take personal development as a locus of study.

In the literature, the definitions of project-based learning, regardless of how numerous they are, seem to converge on defining it as a learner-directed course of action that nurtures experiential learning whereby learners take the lead in the learning process (what to do/ why do it/how to do it) by figuring out problems and situations to be analyzed, processed and investigated. From this vantage point, the traditional role of the teacher as the main knowledge-purveyor is rethought. S/he ends up merely a supervisor or monitor of the end product. One very important didactic virtue which is promoted through this pedagogical ethos is that learners turn into active, autonomous asset holders whose learning needs and styles are keenly catered for. Stenberg (1998: 18) buttresses this didactic strand stating that “*instruction should be geared not just toward imparting a knowledge base, but toward developing reflective, analytical, creative, and practical thinking with a knowledge base. Students learn*

better when they think to learn ...They also learn better when teaching takes into account their diverse styles of learning and thinking”.

PBL and Collectivistic Learning

There is a proclaimed consensus among language educators and scholars on the academically rewarding, collectivistic nature of PBL-based teaching/learning (Hedge 1993; Solomon 2003; Stoller 1997). These scholars, among others, emphasize several key features of the team-bound specificity of PBL. First and foremost, PBL requires team involvement and collaboration in working out a complex issue over an extended period of time. The issue under investigation is invariably deeply embedded in society and calls for concentrated, extensive and collectivistic exploration. Second, PBL is a tutor-independent learning process. It is a process wherein the tutor sits back, and the learner takes the lead in terms of project planning, accomplishment and ultimate presentation. Third, the issues that are investigated are decided upon by the learners themselves, which guarantees the probing of topics and themes which truly capture the interests of learners. Fourth, the role of the tutor as the main actor and purveyor of knowledge is de-emphasized. Accordingly, the classroom turns into a teacher-free environment wherein feedback, experiential knowledge and tentative project-bound outlets are shared and worked out by the group of learners who endorse the project. Additionally, PBL-friendly learning provides an impetus for learners to incorporate ICTs in the learning endeavor through handling hands-on, technology-based activities and tasks. The use of technological platforms to manage data is also done on a collaborative basis whereby learners cooperate in terms of partaking, adopting and adapting their technical knowledge to serve in the realization of the end project. This collaborative spirit is what sustains and maintains learners' efforts to get through with the projects regardless of how challenging and demanding they may be. Each and every learner is considered as a real asset in the accomplishment of the whole project. Learners are basically endowed with various skills, be they social, managerial and/or linguistic, which they exploit together to come up with a valuable end product. Finally, the assessment of the project's quality as well as its presentation is the exclusive responsibility of the learners. What surfaces, then, is that PBL favors not only the notion of collective project realization, but also the notion of authenticity as a cornerstone, underpinning trait for its launching.

On The Notion Of Authenticity In PBL Learning

Markham et al. (2003) underline the authentic aspect of PBL. In contrast to traditional teaching content which is utterly life-unlike, PBL draws upon life-like situations and roles. Learners tend to opt for authentic projects that match their daily life circumstances. This option dovetails with the widely held scholarly belief that learners learn better when they do that in natural, life-related atmospheres. This way, learning is geared not just towards getting the learners to do well in final exams, but also, and most importantly, towards cultivating diverse life skills which can render learners engaged, effective and efficient social and societal actors.

PBL And Learners' Engagement

PBL slots in with several learner-bound development theories, namely Vygotsky's (1978) social development theory whereby the traditional conception of learning as being classroom-exclusive is verifiably refuted. The belief that learning can take place in environments other than classrooms is echoed early on in Dewey's (1902) inquiry-based learning approach which underscores the key significance of self-dependent learning (learning by doing). In so many ways, PBL endorses the premises of these, and other learner-specific, theories pertaining to engagement. In tune with this approach, learners are called for to show a multi-layered engagement, behavioral, emotional, intellectual, physical and social (Blumenfeld et al. 1991; Hutchinson, 2001). Learning, thus, turns out to be the corollary of "cognitive" as well as "non-cognitive parameters.

Behavioral engagement, for instance, is in place when learners are dedicated to the project in terms of regular attendance, continuous evaluation, opinion-sharing and other behavioral aspects. Emotional engagement is at stake when learners demonstrate affective, project-specific reactions. This type of engagement is apparent when learners proactively show an inner motivation to make things happen. Emotions of anxiety, interest, enjoyment and/or frustration are cases of emotional engagement in point. Likewise, cognitive engagement captures the learners' willingness to perform mind-challenging requirements in order to get the project accomplished and delivered to a large public. Given the afore-mentioned pros, PBL seems a potentially useful approach in the EFL teaching/learning realm.

PBL And EFL Learning

Throughout history, English language learning and teaching has undergone drastic methodology-bound changes. Brown (2000) elaborates on the myriad of EFL learning/teaching methods and rightfully assumes that there is no single best method for English language learning. A distinguishing characteristic of contemporary EFL learning/teaching theories is that they tend to give the learner a preeminent position in the classroom sphere while disregarding the "project" as a vehicle for skill-development.

Starting from the grammar translation method and the direct method through the audio-lingual method and the total physical response method to the communicative language teaching and the competency-based method, English language learning has not been project-oriented. The innovativeness of PBL is that it incorporates the underlying tenets of communicative language teaching and similar methods, and in parallel it enhances learners immersion by granting them genuine opportunities to handle real-life learning situations which require learners to operate collaboratively and independently from the tutor so as to foster the target language skills in more meaningful and realistic ways (Richards, 2006).

PBL And The EFL Tutor's Role

One of the biggest professional constraints that EFL tutors face and which result from the adoption of conventional, traditional teaching approaches is the burdensome workload. Because the teaching endeavors tend to be tutor-oriented, it follows that tutors are obliged to work extensively both inside and outside the classroom. Tasks like lesson planning, students' monitoring, exam designing and correcting, among several others, are both time and effort-demanding.

Contrastingly, the tutors' workload is relatively light and much more manageable with the application of PBL-based EFL learning. However, this does not in any way mean that tutors are passive actresses and actors, but they may fulfill other pedagogical functions. As a case in point, tutors can enlighten learners and project-holders on some pathways which can help them carry out their projects in effective and efficient ways. Providing feedback for learners at different stages of the project completion is also a way for tutors to be asset-holders in the project at hand. The implementation of PBL in EFL learning is bound to be useful within and across educational contexts.

EFL Learning In The Moroccan Context

For years, particularly since independence in 1956, the improvement of the educational system has been a top priority for decision-makers in Morocco. The recent educational reform outlined in the official Charter for Education and Training showcases the keen interest of the educational actors to put into operation a high-profile educational system. With regard to EFL learning/teaching, the official guidelines (2007 and 2009) provide clear-cut account on the strategies to be put in place so as to define the roles to be played by tutors and learners respectively. Accordingly, tutors are recommended to serve more as learning facilitators while learners are encouraged to be more autonomous and self-dependent learners. This language-bound policy applies to EFL learning both at school and university levels.

In recent years, there has been a remarkable tendency to give English a preeminent position in the Moroccan educational system- a system wherein Arabic and French used to be the key languages of education and employment. The National Charter of Education and Training, which is the legal framework for educational reform, clearly stipulates that Arabic, French and English are to be given due and equal importance. The rationale behind this reinforcement of a multi-lingual educational system emanates from an outspoken conviction of the decision-makers that speaking different languages would definitely boost Moroccan university alumni employability and marketability in the global job market. This official tendency has led to the implementation of up-to-date approaches in EFL learning/teaching.

Approaches To EFL Education In Morocco

As a practitioner in the Moroccan educational system, I give credit to the educational and pedagogical authorities in Morocco for doing their best to keep up-to-date with the latest trends in EFL learning/teaching. Having served as a language tutor for more than twenty years, I have had the sizeable opportunity to be exposed to and apply different EFL methods and approaches ranging from the age-old grammar translation method to the current standard-based approach. The adoption and adaptation of a large variety of methods and approaches has certainly rewarding benefits pertaining to learners and tutors alike.

At the Moroccan university level, English and English-related disciplines and studies are coveted by a large spectrum of baccalaureat-holders. This is presumably due to the fact that graduating from an English studies department has been a strong asset for professional hiring.

In the following section, I spotlight the pedagogical EFL teaching/learning avenue taken by Moroccan EFL tutors, especially in terms of PBL implementation. Data are collected from the Faculty of Letters and Human Sciences Marrakech, Morocco- a workplace where I am currently working as an EFL tutor. This faculty is an open access institute wherein students learn disciplines and subjects relating to social and human sciences.

Methodology

Given its numerous, scholarly acknowledged benefits, it seems worthy of investigation to collect and analyze data in a methodological way to figure out whether or not PBL is endorsed by Moroccan university practitioners.

Research Questions And Hypothesis

Through this paper, I purport to investigate the Moroccan university language tutors' stance towards PBL in terms of affective endorsement and actual implementation. Accordingly, the research questions to be covered are the following:

- 1- Are Moroccan university EFL tutors aware of the significance of PBL in promoting multi-skilled, authentic language learning?
- 2- Does PBL truly enhance collectivistic EFL learning?
- 3- What hindrances, if any, hamper the implementation of PBL EFL learning at the Moroccan university level?

The hypothesis which underpins the above research questions is as follows: PBL maximizes authentic, collectivistic and student-centred EFL learning. To corroborate or refute the merits of PBL, I have opted for an interview-based, qualitative research method.

The interview

The use of the interview is justified by its scholarly recognized usefulness in gathering experiential, factual data to understand specific phenomena (Kvale, 1996). Interviews are handy ways to get the gist behind the participants' experiential endeavors, orientations and practices. The interview at hand is a face-to-face, personal interview whereby the researcher works directly with the respondents- a method, according to Kvale (1996) that eases eliciting impressions and opinions. Specifically, I have opted for a 'General Interview Guide Approach' wherein the same areas of information are collected from each interviewee. It is also a 'standardized, open-ended' interview because the same questions are asked to all interviewees.

Sample

The target respondents in this investigation are people within my circle of influence, namely my colleagues in the department of English Studies, Faculty of Letters and Human Sciences, Cadi Ayyad University, Marrakech, Morocco. The respondents are chosen randomly because every language tutor in the English department constitutes a viable source of data. I choose 15 respondents for the main constraint of availability. That is to say, for personal and professional constraints, I could not reach out to all my colleagues. The gender identity of the respondents was of minor significance because this is a variable that is beyond the scope of this study to examine. After explaining the rationale behind the interview and specifying how long it would be, the interviewees were given the floor to ask for clarifications on and around the interview.

The interview for data collection

This interview is designed to elicit academic/professional stances towards project-based learning as an approach for EFL teaching/ learning at the Moroccan university level. The identity of the respondents will be kept confidential, and the information they provide will be used for purely academic purposes;

Q1: How long have you been teaching English at Cadi Ayyad University?

Q2: Do you have an idea about project-based learning? Specify

Q3: What are the merits, if any, of this approach?

Q4: Do you make use of PBL to teach specific subjects or disciplines?

Q5: In your opinion, what are the obstacles, if any, that hinder the implementation of this approach in the English department?

Q6: What recommendations, if any, would you suggest for adopting the PBL approach in the English department?

Thanks for your kind collaboration

Data Analysis And Findings

The interviewees responses to the first question pertaining to the number of years they have been serving as EFL tutors at Cadi Ayyad University reveal that all of them have considerably long years as practitioners inside the department of English. The years of experience range between ten and thirty, which means that the respondents have got enough experiential knowledge and practice to be valid and viable source of data for an experience-based investigation of the theme at hand. It is particularly important to mention that all the interviewees were willing and enthusiastic about providing data for this study.

In the second question, I tapped into the interviewees' background knowledge about PBL as an approach in the field of EFL teaching and learning. This question is of key significance in this analysis because having topic-specific knowledge would help in coming up with accurate and specific facts for analysis. This is the reason why I asked the interviewees to specify their bulk of knowledge pertaining to PBL. From the feedback to this question, the interviewees expressed their familiarity with PBL. Besides, they provided pertinent and valuable topic-specific information. After tallying the responses, I figured out three features which distinguish PBL in the interviewees' views. First, the interviews specified the collectivistic trait of PBL in contrast to the individualistic approach

wherein no peer collaboration takes place. Second, the interviewees emphasized the possibility to implement PBL within and across disciplines. Third, the respondents recognized that PBL endorsement was challenging but beneficial. These responses are valuable in the context of this investigation because they get the interview rolling smoothly. Otherwise, it would be impractical to interview them about a concept/approach that they were not acquainted with.

After considering the interviewees' acquaintance with and knowledge about some of the specific features that characterize PBL, I proceeded with the third question whereby I illustrated the eventual merits of PBL. The interviewees' experiential knowledge of the actual merits of PBL was quite discernible. The merits that the interviewees pointed were both various and complementary in so many ways. One of the recurrent merits in the interviews was related to learners' autonomy- an idea which stands out in the literature on PBL. In other words, all the tutors were conscious of the need to give learners more space for action in the teaching/learning process. One of the interviewees clearly specified that the learners' potential is to be keenly accounted for, and that the recognition of this potential does not in anyway underestimate or discredit the tutors' factual academic authority. As a researcher, I reckon that this kind of responses reflects high professional maturity by considering learners' as active asset-takers in the teaching/learning process. Another merit the interviewees accentuated is that PBL eases the accomplishment of tasks by learners themselves in a spirit of collaboration and knowledge-sharing, which reinforces the consideration of one's peers as associates rather than competitors. This team spirit indeed helps the learning process to be far-reaching. As the saying goes: "Alone we go fast, together we go far."

A last, but no minor, merit that the interviewees concurred upon is the authenticity of PBL- an idea that is also fore-grounded in the literature pertaining to PBL. In this regard, the interviewees pinpointed the fact PBL is a handy way to bridge the gap between classroom life and real life by granting learners to work on projects they themselves choose, in natural environments they see fit, and in ways they find most fruitful. The responses to this question reveal the interviewees' substantial awareness that the advantages of adopting PBL far outweigh any probable downsides.

In the fourth question, I zoomed upon the interviewees' actual use of PBL in teaching any discipline or subjects. Unexpectedly, there was a quasi-unanimous response among interviewees about stepping away from PBL as an approach. This response seemed quite weird for all the interviewees paid lip service to PBL as an academic approach, but the majority did not make use of it to teach any subject or discipline. This response was an impetus to promptly cover the fifth question relating to the obstacles that were likely to impede the implementation of PBL in the Moroccan EFL university context, namely in the department of English at the School of Arts and Humanities Marrakech.

The interviewees seem to have a tacit consensus on the constraints that prevent the endorsement of PBL in the department of English. First and foremost, the interviewees had real concerns about the heavy workload that they were up to. This workload was the result of the tutor-oriented educational policy in place in Moroccan universities. The tutor is in fact the sole actor in charge of effort and time-consuming tasks, such as teaching, examining, correcting and end-of-study "memoire" supervision. Another concomitant obstacle raised by all interviewees is the class-size which does not favor going PBL. With hundreds of learners to teach and monitor every semester, interviewees revealed, the implementation of PBL-bound English teaching strategies would be fallacious. A final, but no least significant, obstacle that the majority of the interviewees accentuated pertains to presumable flaws in the Moroccan educational system as a whole which does not cultivate a project-bound, collectivist, teacher-free approach to learning. The interviewees provide factual information showing that in Moroccan primary schools, junior high schools and high schools the spirit of autonomous, collaborative, project-based learning is not on the educational agenda. As a follow-up, the interviewees conceded, the implementation of PBL at the university level remains far-fetched.

So as not to remain at the descriptive stage, I asked the interviewees in question six to suggest experience-based recommendations to ease the implementation of PBL in the English department. Basically, the recommendations that the interviewees suggested overlapped in significant ways with the obstacles outlined above. One of the urgent recommendations consisted of reconsidering the burdensome workload assigned to each and every tutor on a semestrial basis. Another telling recommendation pertained to the absolute necessity to reduce class-sizes to facilitate all kinds of student-centred learning approaches, including PBL. One last recommendation drew upon raising learners' awareness on and initiating them to the fact that learning is a joint endeavor wherein the learners and the tutors need to be astutely involved.

Conclusion

This study focused on the implementation of PBL to ease collectivistic EFL learning at the Moroccan university level. The study was tutor-oriented in the sense that it sought to elicit the tutors' experiential consideration of PBL as a means to augment learners' skills and boost their ratio of autonomy and self-confidence.

In the literature review, I gave a general overview of PBL, and I exposed the presumable benefits of PBL in the language education context as a means to step away from a tutor-bound pedagogical process and to foster a student-oriented parameter whereby the learners are not there merely to internalize academic content but rather to nurture

skills that can render them self-dependent, engaging, driven, perceptive, sharp and responsible learners. All these assets, and more, can be cultivated through the involvement of learners in getting projects rolling.

In the practical part, I identified several variables which hamper a full implementation of PBL in the teaching of EFL at the Moroccan university. Using the qualitative interview as a means to elicit data, I interviewed a set of fifteen university professors in the department of English studies at the Faculty of Letters and Human Sciences Marrakech.

The findings account for the conspicuous awareness of Moroccan EFL university tutors of the multiple academic benefits of PBL. Data also reveal lack of tutors' readiness to go PBL, and this is because of a myriad of system-bound constraints. Eventually, the interviewees suggest practical pathways for a beneficial, smooth implementation of PBL in the EFL Moroccan university framework.

Far from overestimating PBL, this study argues for the absolute necessity to embrace this approach not only by Moroccan university EFL tutors, but also by educational decision-makers to hurdle the systemic hindrances that prevent its full implementation. Future studies in this area may involve a larger number of respondents nationwide. University EFL learners in different Moroccan universities may be also a source of valuable data. All things considered, this study puts forth PBL as an alternative, rather than a magic panacea, to ensure high-quality EFL teaching/learning in the Moroccan university.

References

- Blumenfeld, P. C., Soloway, E., Marx, R.W., Krajcik, J., Guzdial, M., & Palincsar, A. (1991). Motivating project-based learning. *Educational Psychologist*, 26 (3 & 4), 369-398.
- Brown, H. D. (2000). *Principles of Language Learning and Teaching*. New YORK: Longman.
- Hedge, T. (1993). Key concepts in ELT. *ELT Journal*, 74 (3), 275-277.
- Hutchinson, T. (2001). *Introduction to Project Work*. Hong Kong: Oxford University Press.
- Kern, R. (2000). *Literacy and Language Teaching*. Oxford: Oxford University Press.
- Kvale, S. (1996). *Interviews: An Introduction to Qualitative Research Interviewing*. New York: Sage Publications.
- Markham, T. Mergendoller, J. Larmer, J. & Ravitz, J. (2003). *Project- Based Learning Handbook*. Canada: Buck Institute for Education.
- Mc Kay, S. (2002). *Teaching English as an International Language: Rethinking Goals and Approaches*. Oxford: Oxford University Press.
- Richards, J. C. (2006). 30 Years of TEFL/TESL: A Personal Reflection. Retrieved from <http://www.professorjackrichards.com/pdfs/30-years-of-TEFL.pdf>.
- Solomon, G. (2003). Project-Based Learning: a Primer. *Technology & Learning*, 23, 10-20.
- Stoller, F. (1997). Project Work: A Means to Promote Language Content. *Forum*, 35 (4), 2-20
- Vygotsky, L. (1978). *Mind in Society: The Development of Higher Psychological Process*. Cambridge, MA: Harvard University Press.

The Relationship between Ethical Leadership and Vocational Education Schools' Image in Thailand

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Abstract

The purposes of this research were to study the relationship between ethical leadership of school administrators and the vocational education schools image. This research was survey research with the sampling group of 327 persons including 35 administrators, 196 teachers, 40 school committees, and 56 students of association of future Thai professional. The research instrument was the questionnaire with validity ($0.50 \leq IOC \leq 1.00$) and reliability (0.965). The statistical data was analyzed by statistics computer application to search the correlation coefficient by Pearson's Product Moment Coefficient. Research findings were as follows: The positive relationship between ethical leadership of school administrators in six components are responsibility, respectfulness, reliance, justice, empowerment, and honesty and the vocational education schools' image was found with statistical significance at the .01 level ($0.738 \leq r \leq 0.852$). The highest correlation coefficient of ethical leadership of school administrators through the schools image in descending order were responsibility ($r = 0.852$), reliance ($r = 0.847$), respectfulness ($r = 0.829$), honesty ($r = 0.824$), empowerment ($r = 0.822$), and justice ($r = 0.738$).

Keywords : *Ethical Leadership, Vocational Education, Schools' Image, Relationship*

Background and Significance of Study

Studies show that many institutions and departments have experienced similar problems with a shortage of qualified Thai labor who meet production standards and an absence of effective measures for quality assessment of the labor force. Hence, the great challenge, nowadays, is to provide a qualified workforce with a high capability for competing globally. A review of the data on management of vocational education and overall national education in Thailand shows that the ratio of students in general education to vocational education is 60:40. This ratio could be a result of the popularity of general education among youth; however it is a problematic trend in the context of needing middle-level manpower. Although a plan and preparation for enrolling and supporting more students at vocational and technical certificate levels have been made, the number of students enrolled in these programs has been considerably low relative to the target number. These findings are consistent with studies Kattiya Nutawatr (2009) and Theerawut Boonyasopon (2010), which found that the decreasing number of students in vocational education could be a result of many factors, i.e., values held by parents who want their children to get a certificate in general education so that they can work in other fields, a lack of information on the advantages of studying in vocational education, or the image of vocational institutes, which may appear to be violent due to disputes among certain groups of vocational students. The latter causes fear among parents toward sending their children to a vocational institute.

As mentioned, the number of students in vocational education continues to fail to meet the target as a result of school image and unpopularity among parents and students. Hence, these institutes' administrators need to adjust their management styles, especially in terms of ethical leadership. School administrators' behavior must represent strong ethical leadership in order to promote ethical values in the institute. Furthermore, an ethical leader represents philosophies and mechanisms that strengthen an organization and society. The difference between ethical leadership and other types of leadership is that ethical leaders are the heart of an organization; they are those who drive the organization forward using positive means rather than force. Ethical leaders concentrate on the following aspects of leadership: being a good and ethical role model, having a sincere relationship with subordinates and executives, promoting a pleasant work atmosphere and teamwork, engaging others in decision-making based on good ethics, paying attention to others, and encouraging others to develop and empower themselves

(Boonjan Sisan, et al., 2010). These essential components of leadership are similar to those discussed in Siwalee Sirilai (2007), which states that an institute's leader must be a smart and good person, where a smart person refers to one who has skills, knowledge, creativity, and proficiency, and a good person refers to one who has ethics and morals, devotion, honesty, a sense of justice, and responsibility. If school executives can gain respect and acceptance from students, instructors, parents, and their community by demonstrating ethical and moral behavior, they may possibly have an effect on and promote a positive school image and attitude, which can lead to a higher level of acceptance from society toward vocational education.

The challenges mentioned above drew the researcher to investigate the relationship between ethical leadership of educational institutes' leaders and the school image of institutes that provide vocational education in Roi Et Province. The researcher hoped to gain crucial information that would be useful for educational institutes in developing their school image and promoting characteristics of ethical leadership among school executives so that such institutes could enhance their efficiency in managing vocational education.

Research Objective

To study the relationship between the ethical leadership of leaders in educational institutes and the school image of institutes providing vocational education in Roi Et Province.

Research Methodology

1. Research Methodology: In this study, a descriptive research method was adopted to conduct a correlation study. The study was divided into two phases: Phase 1 consisted of research instrument development through focus group discussion, and Phase 2 involved surveying to collect data from the sample groups in order to investigate the relationship between the ethical leadership of educational institute leaders and the school image of institutes providing vocational education in Roi Et Province.

2. Sample Group: The total population of leaders and students in the study consisted of 35 leaders of educational institutes conducting vocational education in Roi Et Province and 56 students from vocational schools. The number of instructors and committee members of educational institutes was determined using Yamane's formula (Theerawut Akakul, 2000). With 5% allowable error and using a stratified random sampling method with a population divided by the size of the institute, the calculation resulted in an instructor sample of 196 instructors and a committee member sample of 40 committee members. Therefore, the total sample size of this study was 327 people.

3. Research Instrument: The questionnaire used to collect data on the relationship between the ethical leadership of educational institute leaders and the school image of the institutes providing vocational education in Roi Et Province consisted of 3 parts, as follows:

Part 1 consisted of five check-list items aiming to collect general information of the respondents: sex, position, education, experience in current position, and size of the institute.

Part 2 consisted of 26 questionnaire items on the ethical leadership of educational institute leaders in institutes providing vocational education in Roi Et Province.

Part 3 consisted of 27 questionnaire items on the school image of the institutes providing vocational education in Roi Et Province.

4. Data Analysis: The data collected from the questionnaires were analyzed by software to measure the Pearson's Product Moment Correlation Coefficient, which determined the relationship between the ethical leadership of educational institute leaders and the school image of the institutes providing vocational education, and a multiple regression coefficient analysis was conducted between ethical leadership of educational institute leaders and school image.

Results

The researcher investigated the relationship between the ethical leadership of leaders in educational institutes and the school image of institutes providing vocational education in Roi Et by finding the Pearson's Product Moment Coefficient. The results of the study revealed that the correlations among ethical leadership characteristics of educational institute leaders, including justice, honesty, responsibility, respect, trustworthiness, and implementation of school image empowerment, were positive, with correlation coefficients ranging from 0.738 – 0.825 and statistical significance at .01

among all variables for vocational institutes in Roi Et Province. Regarding the correlation of specific variables among the different ethical leadership characteristics, responsibility, trustworthiness, and respect were found to have the strongest positive correlations with school image, with correlation coefficients of 0.852, 0.847, and 0.829, respectively. In contrast, ethical leadership that demonstrated a sense for justice and involved implementation of school image empowerment were the two factors with the lowest positive correlations ($r = 0.738$), with statistical significance at .01, as shown in Table 1 below.

Table 1 Pearson's Product Moment Correlation Coefficients between ethical leadership of educational institute leaders and school image of institutes providing vocational education in Roi Et Province.

Variables	X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	Y
X ₁	1						
X ₂	.898**	1					
X ₃	.841**	.931**	1				
X ₄	.848**	.899**	.866**	1			
X ₅	.855**	.935**	.930**	.903**	1		
X ₆	.843**	.932**	.922**	.889**	.936**	1	
Y	.738**	.824**	.852**	.829**	.847**	.822**	1

** Correlation is significant at the 0.01 level (2-tailed)

Discussion

The results of this study investigating the correlation between ethical leadership of educational institute leaders and school image of institutes providing vocational education in Roi Et Province show positive correlations among all facets, with statistical significance at .01. "Very strong" positive correlations were found for all of the facets apart from justice, which had a "strong" positive correlation. The findings conform to the hypothesis of this study, which anticipated that there would be a correlation between ethical leadership of educational institute leaders and school image of institutes providing vocational education in Roi Et Province, with a strong correlation between responsibility and school image at the highest level, and a strong correlation between justice and school image at the lowest level. That the correlation coefficient value of responsibility and school image ranked the highest could be a result of the nature of administrative work, which must drive the institute to achieve its vision, mission, goals, and objectives. In the work process, there should be task delegation and a committee to create more learning opportunities, including opportunities for all parties to participate in investigations. Additionally, school executives should take responsibility as role models for school staff. This can be achieved in a variety of ways, i.e., punctuality and devotion to doing work, with the priority being to show responsibility toward one's work and decisions made, regardless of whether the consequences are positive or negative. As explained in Theerawut Akakul (2000), positive behaviors, actions, and the expression of staff and officers in an institute or a department lead to a positive image. In addition, Boonjan Sisan, et al. (2010) concluded that the direction of an institute depends on the executives, and a good executive must have the knowledge and proficiency to lead. If an institute has such an executive, with good visions, management policy, and honesty, the institute will gain a positive image. This conclusion is consistent with Siwalee Sirilai (2007), which states that an institute's leader must be a smart and good person, where a smart person refers to one who has skills, knowledge, creativity, and proficiency, and a good person refers to one who has ethics and morals, devotion, honesty, a sense of justice, and responsibility. These qualifications explain why being responsible, which is one of the characteristics of ethical leadership that must be demonstrated by educational institute leaders, has a strong relationship with school image. This finding is further supported by Kamolthip Thongkamhaeng (2011), a research study on strategizing for ethical leadership development of public school executives

which found that at the time the study was conducted elements of ethical leadership for a career were rated highly, as well as all characteristics of ethical leadership. The two characteristics that ranked at the top were devoting one's full attention to one's work and working responsibly in a way to continually improve. These rankings also conform to Office of Teacher and Educational Personnel Commission (2005), a study exploring the ethical and moral leadership of school executives as perceived by teachers under the Secondary Education Service Area Office 38 (Sukhothai – Tak), which found that work performance was rated at a high level, and responsibility toward work and making decisions was rated the highest. Moreover, the findings from the present study are also consistent with Vachirawit Yangchai (2011), a study on factors affecting the school image of Suranaree University of Technology, which found a strong positive correlation between factors related to the school executives and school image, with statistical significance at 0.05. Similarly, Rungrawan Senarak (2009) investigated factors affecting school image for the Institute of Physical Education, and found that the executive group was a predictor variable that had a strong correlation with the image of the institute, according to perceptions of all groups, including administrative members, teachers, and students, with statistical significance at 0.01. In conclusion, responsibility as one of the characteristics of ethical leadership in educational institute leaders has a strong relationship with school image of institutes providing vocational education in Roi Et Province, as executives are the main mechanism in the development of education and the institution toward efficiency and effectiveness. Executives play a great role in school image, requiring that an executive have the following attributes: knowledge, management proficiency, characteristics of ethical leadership, good human relations, visions, and ethics and morals, as all of these traits greatly affect image, reputation, and the prestige of an educational institute. Such traits will also ensure learners, parents, the surrounding community, and society that the institute is accountable and effective in providing education, as this is a crucial element in making the decision to enroll in the institute. As a result, it is highly necessary to have executives that can demonstrate ethical leadership, especially in terms of responsibility, to enhance the level of credibility and trustworthiness of the institute. This would also lead to a good relationship between the institute and the surrounding community, as well as cooperation to help the institute become successful

References

- Kamolthip Thongkamhaeng. (2011). **Strategies for the development of moral leadership for private school administrators**. Thesis of Doctoral Degree, Department of Educational Administration, Graduate School, Chulalongkorn University.
- Kattiya Nutawatr. (2009). **The decision process of studying further in the Lower-vocational certificate of private school's students in Bangkok**. Thesis of Master Degree, Department of Educational Administration, Graduate School, Chiang Mai University.
- Theerawut Boonyasopon. (2010). **The development of Thai vocational education and technology for the next decade**. Technical education journal King Mongkut's University of Technology North Bangkok.
- Theerawut Akakul. (2000). **Research methodology in behavioral sciences and social sciences**. Ubon Ratchathani: Ubon Ratchathani Rajabhat University.
- Boonjan Sisan, et al. (2010). **An analysis the factor of servant leaderships for teacher in basic education school**, Ministry of Education. King Mongkut's Institute of Technology Ladkrabang.
- Rungrawan Senarak. (2009). **Factors related to an image of Institutes of Physical Education** Thesis of Master Degree, Department of Educational Administration, Graduate School, Mahasarakham University.
- Vachirawit Yangchai. (2011). **An analysis of the image of vocational education from the perspective of students: Mixed methods research** Thesis of Master Degree, Department of Educational Research Methodology, Graduate School, Chulalongkorn University;
- Siwalee Sirilai. (2007). **Fundamental of thinking reasoning and ethics**. Bangkok: Suan Sunandha Rajabhat University.
- Office of Teacher and Educational Personnel Commission. (2005). **The Rule of Teacher and Educational Personnel Act of B.E. 2547**. Bangkok: Printer of Educational Council.

The Relationship Between Foreign Language Anxiety And Motivation Of Turkish University Students In Learning English As A Second Language

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1. Introduction

Foreign language anxiety and motivation have been long considered vital elements having effects on language learning. Both of these constructs are highly correlated to foreign language achievement. The present study was conducted on university students studying in Turkey where English has become a priority among the subjects taught in curricula. It is the most widely taught foreign language at all stages of the education system. Most Turkish learners begin to learn English at early ages and keep studying English throughout and beyond their academic life although most of them cannot get the desired level of proficiency either in receptive or productive skills, or in both. The reason for being a great challenge for them is the limited contacts with native speakers of English, and lack of opportunities to put their learning into words by practicing in their everyday lives. The data from the studies based on the factors of the problem reveal that learners try to compete with difficulties of anxiety factors in the process. Hence, other studies revealed that anxiety and motivation are among the important predictors showing the relationship in view of their opposing effects in second language learning (Yang, 1998 ; Noels, Clément, & Pelletier, 1999).

1.1. Foreign Language Anxiety

English language plays a vital role in ensuring nation building. For English as foreign language students in Turkey, learning English has always been a great challenge due to limited contact with target-language speakers, and lack of opportunities to practice English in their daily lives. Most students are only exposed to English in classes, which make foreign language learning entirely difficult for them to remain motivated to learn English.

An issue of increasing importance in the study of second language teaching is the role of second language anxiety. Anxiety is one of the most significant and pervasive emotions and has been a main focus of a growing body of research in foreign language education for years. In light of the studies, the presence of anxiety and its extensive effects in language learning and teaching have been confirmed. In terms of definition, several researchers have offered definitions of foreign language anxiety. The phenomenon of anxiety has generally been defined as an emotional reaction to learning, an experience of uneasiness and unpleasant emotions associated with subjective feelings of tension and nervousness. According to Horwitz, foreign language anxiety is "a distinct complex of self-perceptions, beliefs, feelings, and behaviors related to classroom language learning arising from the uniqueness of the language learning process" (1986). Since it is mostly related to feelings of worry and apprehension, some concerns which are the feelings uneasy about potential failure or poor performance impair the performance and effort to employ some cognitive skills through the target activities have a remarkable impact to influence learners' motivation and performance in the process. . Similarly, Clement views foreign language anxiety as a complex construct which shows its impacts on especially learners' psychology in terms of emotional factors and self-confidence (1980).

Anxiety and language learning are two so complicated phenomena that countless studies have been conducted on the mainstream of impacts of anxiety on foreign and second language learning. Hence, foreign language anxiety cannot be studied in isolation because multiple provoking factors such as personal and interpersonal beliefs, personalities, level of achievement, apprehension, self-efficiency and self-concept of learners, limited cognitive skills, and learner and situational variables could play a vital role in the development of a level of anxiety in learners. The effects of variables and factors could result in poor performance or a side effect caused by some language learning difficulties both directly and indirectly. Adverse effects of anxiety could be observed when learners are constantly preoccupied with any negative effects and the threats posed by learning situation. In that case, it is really challenging to concentrate and maintain long-term attention on one's target. Likewise, high-anxious learners who tend to perform much worse than low-anxious learners choose to remain silent in classes and target activities because they are deeply worried about lack of oral proficiency in target language or making stupid mistakes and losing faces before their counterparts.

MacIntyre and Gardner (1991) identified three approaches to the study of anxiety, which are trait anxiety, state anxiety, and situation-specific anxiety. Over years, trait anxiety, state anxiety and situation-specific anxiety have become the mainstream approaches in foreign language teaching and learning since they have remarkably vital roles in enhancing learners' language acquisition and learning in some ways. Trait anxiety occurs in response to a perceived threat. Also, it differs from other types of anxiety in terms of its duration, intensity and the range of situations in which it occurs. It is a kind of stable personality characteristic that people with trait anxiety mostly experience excessive anxiety and worry by anticipating a potential threat of future events in a variety of situations. Hence, it is difficult to get rid of. Unlike trait anxiety, state anxiety can be described as a temporary unpleasant

feeling in a person who makes a mental assessment of a kind of threat. It is more likely to seriously disturb the learners' ability to react positively in a certain environment. However, if the events or objects perceived as a threat go away, the person having state anxiety no longer experiences the side effects of the unpleasant feelings. Situation-specific anxiety is considered as a trait anxiety, which is experienced in a changed or new situation a learner is exposed to. Often, learners become uneasy in crowds or a new atmosphere that makes them uncomfortable. Its occurrence is common in a learning setting.

Considerable attention has been directed to the examination of debilitating and facilitative anxiety. Debilitating anxiety is seen as a threat to learners' consciousness and production of second language while facilitative anxiety entirely encourages them to perform well. Scovel considers that a certain level of anxiety stimulates language learning effectively by promoting learners to overcome the perceived level of difficulty of foreign language (1978). On the other hand, an excessive amount of anxiety would lead to withdrawal, avoidance in a practical activity and an inefficient learning performance. As a result, it makes learners demotivated and unwilling towards target language since the impacts of debilitating anxiety interfere with learning a foreign language in a negative way.

Anxiety can be seen in two forms: harmful or debilitating anxiety and helpful or facilitating anxiety. According to the results of some studies, debilitating anxiety is regarded harmful because it inhibits learners' performance, reduces the creativity of learners in foreign language, and causes unwillingness towards learning in students. Alpert & Haber focus on its debilitating effect that motivates the learner to withdraw from the language task and leads him to adopt avoidance behaviors (1960). Anxious learners suffer from the fear of having inadequacy in acquisition, comprehension and production.

1. Motivation

One of the factors affecting the effectiveness of learning is motivation arising from desire that drives a person to strive and makes him eager to learn a foreign language and gain some skills of that language. It has long been considered to be an important predictor of second language learning and various definitions were made by the scholars (Gardner & Lambert, 1959; MacIntyre et al, 2001; Pintrich & Schunk, 2002). It can be called the desire, need or urge to learn, do, achieve or acquire something. McDonough describes motivation as "a general cover term – a dustbin – to include a number of possibly distinct concepts, each of which may have different origins and different effects and require different classroom treatment." (1981).

On the other hand, the pioneers of motivation research, Gardner & Lambert, conducted a study in 1959 in order to find out the relations between the attitudes of learners toward the community of a second culture and their motivation to learn the language of that culture. In the core of the study, they also focused the distinction of two types of motivation in learners; intrinsic and extrinsic motivation. Intrinsic motivation refers to internal desire to perform an action because it is enjoyable and satisfying while extrinsic motivation is viewed as a behavior that arises from external conditions and aims to gain an external reinforcement.

Two types of motivation are identified:

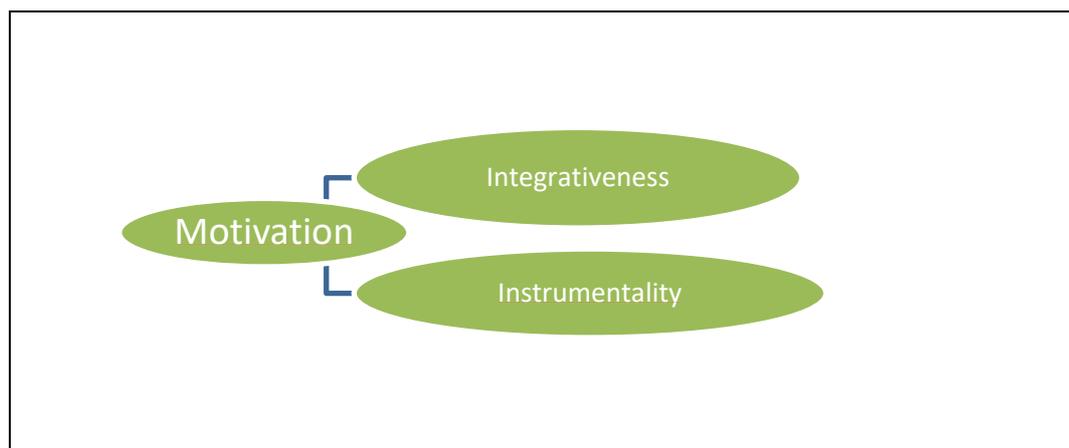


Figure 1. Types of Motivation

Intrinsic motivation is a willingness to communicate with others, having high level of enthusiasm towards learning English, improve oneself in L2 without having any ambitious to receive any instruments or rewards from outside. For instance, a learner who is interested in improving their English to speak well and fluently would be intrinsically motivated to do so without requiring contingent consequences such as praise from the parents or teachers. The effort of the intrinsically motivated learner is focused on the solution to a weakness or problem since the challenge

of overcoming the matter provides a sense of contented feelings. Gardner also claimed that intrinsic motivation has a positive relationship related to achievement in language proficiency.

Extrinsic motivation, however, comes from external factors driving learning for instrumental goals such as making money or being appreciated by others. It is a reward-driven attitude which is a type of conditioning focusing on awards, punishments or actions what individuals will receive as a result. In other words, these individuals are motivated to learn something not because they are willing to learn it, but taking an action to learn something in them is based on obtaining good scores, parental praise, instructor approval, etc. Even though it is stated that intrinsic motivation plays a crucial role in foreign language learning more, some researches showed that the learners who tend to be motivated more instrumentally than intrinsically in terms of gaining and improving the target skills in second language are fully conscious about their actions and can regulate their behavior because their behavior is carried out to achieve the result. A study conducted among Pakistani and Nigerian people shows that large populations and wide salary gaps create a strong motivation for the citizens to learn English to have a better economic condition and gain social prestige by joining the ranks of salaried professionals (December, 2010).

1.3. Foreign Language Anxiety and Motivation

Foreign language anxiety and motivation both are closely related to each other in foreign language learning process. In addition, they can potentially influence various levels of learners' language acquisition and achievement in some ways. Many studies regarding the relationships between language learning anxiety and motivation have drawn attention to the concern of some scholars. For instance, if students feel motivated, they have less anxious feelings and can expend effort to get involved in the learning activities more. And this was supported by the results of questionnaires conducted to find out the correlation between anxiety and motivation, as well. Liu and Huang pointed out that foreign language anxiety was significantly negatively correlated with motivation since the results revealed that low-anxious learners were willing to perform better than high-anxious learners who tended to speak mostly briefly or sometimes remained silent when having to speak target language (2011).

Motivation is one of the factors that influence the rate and success of language learning. Learners with high motivation and a low level of anxiety are thought to be better equipped for success in second language learning. And literature shows that there is a considerable link between anxiety and motivation to learn target language since both anxiety and motivation can significantly predict the English achievement of the language learners within language context. However, language anxiety often works against motivation to learn. According to Clément, Dörnyei and Noels (1994), learners who are more willing to learn a second language are usually less anxious learners who have better self-consciousness, higher achievement, and self-confidence. Another study has similar results to these findings. Sidhub indicated that if students have increasing level of anxiety in language context, it causes negative attitude and perception toward English in them, and also reduces the level of motivation of the students regardless of language proficiency, gender, intelligence, etc. (Jaina and Sidhub, 2012).

1.4 Statement of Problem

Considering the effects of anxiety for the learners who start learning English and carry out gaining and improving the skills throughout their life is a remarkable point that has to be considered by educators. The impacts of anxiety are negatively associated with motivational factors in effective teaching. According to Bailey, Daley and Onwuegbuzie, most learners display high level of anxiety due to poor knowledge, fear of making mistake, losing face, teachers' behaviors, embarrassment, etc. in their learning setting (1999).

1.5. Purpose of the Study

The current study investigates the possible relationship between foreign language anxiety and motivation in English Language teaching setting. In the light of other studies, it tries to find out the negative or positive impacts of anxious feeling in learners. And trying to find answers to the questions whether the anxious feelings play an important role in the learners' performances and how the learners are affected is another objective of the present study.

1.6. Research Questions guided in the study;

- 1- Is there any significant relationship between foreign language anxiety and motivation?
- 2- Do FLL have high level of anxiety in English learning?
- 3- How do the learners experience the effects of anxiety in their learning?

Method

2.1 Participants

The study was conducted at Beykent University in the second term of the Academic Year 2016-2017. All of the participants, 150 in total, were students attending a one-year English Foreign Language instruction at the School of Foreign Languages Preparatory Program. They were A1 level students who were placed according to the placement test results received by them at the beginning of the academic year. Most of them had to enroll in the preparatory school courses because it was a compulsory pre-requisite for their departments. Participants' age ranged from 17 to 21 years.

The students of Preparatory Program have twenty-seven hours of English classes each week composed of a main course and skills courses that are listening and speaking, reading, and writing. A modular system that comprises of Breakthrough, Waystage, Threshold and Vantage levels is applied. Students are placed in the system according to their levels. And each module lasts for eight weeks. They have quizzes each week for the main course where they are assessed to monitor their progress. At the end of each module, they sit a final exam to pass the compulsory language program.

2.2 Data Collection Tools

By means of utilizing questionnaires used in existing studies in literature, data were gathered from the students. The original Turkish versions of the questionnaires were administered to the participants in case the students may misunderstand or cannot comprehend all of the statements in the questionnaires.

2.2.1 Questionnaire Concerning Anxiety

The questionnaire was originally developed by Kitano (2001), Schmidt et al (1996) and then translated into Turkish and used by Boyno (2011). In the questionnaire, there are 14 items scored on three-point scale with 1 meaning "Disagree", 2 means "Undecided", and 3 means "Agree". The questionnaire does not include any sub-headings yet 14 items investigating the statements of stress in learners and, gather specific information on the sources of foreign language anxiety from participants' perspective.

2.2.2 Questionnaire Concerning Motivation

The other questionnaire is a standard questionnaire developed by Kiss & Nikolov, 2005; Schmidt, Boraie & Kassabgy, 1996; Csizér & Dörnyei, 2005; Yashima, n.d.; Yashima, Zenuk-Nishide & Shimizu, 2004; and R. C. Gardner, 1985), translated into Turkish and used by Boyno (2011). It contains 34 Likert scale items scored on a 3-point scale. And it uses 2 different evaluation types. The items from 1 to 27 are evaluated in accordance with a three-point scale: 1 indicating disagree, 2 indicating undecided, and 3 indicating agree. The items from 28 to 34 were multiple-choice items. The items measured the dimension of motivation in the participant in terms of the instrumental or integrative motivation.

2.3 Data Collection Procedure

The permission from Beykent University and the Head of School of Foreign Languages was taken before the questionnaires were administered to the students. Also, the students were asked for approval to participate in the study and were informed about the nature and aim of the current study in order to create sincere and secure environment for them. Data were gathered at the beginning of the second term. The questionnaires were given to the students under the supervision of their instructors to conduct them in a reliable way.

2. Results

This part presented the analysis of the data obtained from the students who participated in the study. The figure was used to display and analyze the findings. The results were given in Table 1.

Table 1. *Correlation between Foreign Language Anxiety and Learner Motivation*

<i>Correlations</i>					
		Foreign Language Anxiety	Integrative	Instrumental	Motivation
Foreign Language Anxiety	Sig.		0, 004	0, 620	0, 037
	Pearson Correlation	-1	-0,232	-0,041	-0,170
	N	150	150	150	150

As seen in Table 1, the scores considering foreign language anxiety and motivation in learners are high. This can be explained by the fact that anxiety and motivation are significantly and negatively correlated in the findings. It is surprising to find that the only dimension of motivation having correlation with foreign language anxiety is integrative motivation ($r = -0.232$; $p < 0.05$). No statistically significant correlation between foreign language anxiety and instrumental ($r = -0.041$; $p > 0.05$), as well as motivation in general ($r = -0.170$; $p > 0.05$) was found. In addition, all correlations are negative.

Considering the results, it is possible to infer that anxiety hinders the learners from gaining positive perceptions towards learning English, thus the learners become demotivated and reluctant in learning setting. We can say that these findings prove the importance of the level of anxiety for a negative perception of learner autonomy.

3. Conclusion And Discussion

The purpose of this study was to find out the relationship between foreign language anxiety and motivation and to investigate the simultaneous effect of foreign language motivation and anxiety on students' learning. The findings reveal several significant facts about the correlation between foreign language anxiety and motivation in second language learning. The impact of anxiety on second language learning motivation without regarding other majors is undeniable, especially for non-English learners. The findings show that if the learners have some worries and anxious feelings about the target language, motivation is influenced negatively, and anxiety reduces the level of motivation in their learning process. As a result, they will probably gain a negative perception making them reluctant to take an active role in their own learning in the language learning process. It is possible to say that this negative perception hinders the learners to get involved in the classroom activities that are really effective to foster their receptive and productive skills in English. So, they tend to be remain quiet most of time when learning English due to the demotivating impacts of anxiety.

On the other hand, the level of integrative motivation in non-English majoring groups is remarkably high since most of the participants are willing to learn English for their own satisfaction and success. They put effort into gaining the abilities and practicing them properly in target activities. It is indicated that the learners participated in the study who are intrinsically motivated were able to overcome the difficulties of the impacts of anxiety they encountered in the learning process. This idea would be supported with an idea that intrinsically motivated learners have a moderate level of anxious feeling and also experience some problems in their English learning process because of anxiety. However, they have power to turn into the negative potential effects of anxiety into a pleasant and practical condition to be nurtured as intrinsically motivated learners to increase the control the emotions through their learning and performance in some way since they have a desire and ambition to achieve a goal to be successful. Thus, they can take control to reduce and overcome the challenges of anxiety appearing through the classroom activities by considering their wishes and goal. This type of learners is luckier to get rid of any problems about their learning thanks to their positive perception they have gained. In light of the findings, it can be thought

that the source of low language motivation could be a cause of anxiety. Other studies conducted (Clement, Dörnyei and Noels, 1994; Sidhu, 2012) are consistent with the findings of the present study in many ways. These studies also state that the higher the level of anxious feelings the learner has, the less the learner would have motivation for learning a new language.

It is not surprising to find out that the learners could not achieve to reach the desired level they wanted due to negative impacts of anxiety if they are extrinsically motivated to learn and acquire the skills of the target language. The environmental factors encourage them to take part in the learning process to get an award at the end of this process. If no an award or present, there is no need to make an effort to acquire any knowledge in target language.

References

- Alpert, R., & Haber, R. N. (1960). *Anxiety in Academic Achievement Situations*. Journal of Abnormal and Social Psychology, 61, 207-215.
- Onwuegbuzie, A. J., Bailey, P. & Daley, C. E. (1999). *Factors associated with foreign language anxiety*. *Applied Psycholinguistics*, 20 (2), 217 – 239.
- Clément, R. (1980). Ethnicity, contact, and communicative competence in a second language. In H. Giles, W. P. Robinson, & P. M. Smith (Eds.), *Language: Social psychological perspectives*. Oxford, United Kingdom: Pergamon Press. pp. 147-154.
- Clément, R., Dörnyei, Z., & Noels, K. A. (1994). *Motivation, self-confidence and group cohesion in the foreign language classroom*. *Language Learning*, 44, 417-448
- Gardner, R. C., & Lambert, W. E. (1959). *Motivational variables in second-language acquisition*. *Canadian Journal of Psychology*, 13(4), 266–272.
- Jain, Y & Sidhu, G. K. (2012). *Relationship between anxiety, attitude and motivation of tertiary students in learning English as a Second Language*. *Procedia - Social and Behavioral Sciences* 90 (2013) 114 – 123
- MacIntyre, P. D. & Gardner, R. (1991). *Methods and results in the study of anxiety and language learning: A review of literature*. *Language Learning*. 41. 85-117.
- Horwitz, E., Horwitz, M., & Cope, J. (1986). Foreign language classroom anxiety. *Modern Language Journal*, 70, 125-132
- Jaina & K. Sidhu. (2012) ; *Relationship between anxiety, attitude and motivation of tertiary students in learning English as a Second Language* .*Procedia - Social and Behavioral Sciences* 90 (2013) 114 – 123
- MacIntyre, P. D., Baker, S. C., Cle'ment, R., & Conrod, S. (2001). *Willingness to communicate, social support, and language-learning orientations of immersion students*. *Studies on Second Language Acquisition*, 23, 369-388
- McDonough, S. H. (1981) *Psychology in foreign language teaching*. London: Allen and Unwin
- Noels, K.A., Clément, R., & Pelletier, L.G. (1999). Perceptions of teachers' communicative style and students' intrinsic and extrinsic motivation. *The Modern Language Journal*, 83 (1), 23-34.
- Pintrich, P. R., & Schunk, D. H. (2002). *Motivation in education: Theory, research, and applications*, 2nd edition. Upper Saddle River, NJ: Merrill Prentice-Hal
- Liu, M. & Huang, W. (2011). An exploration of foreign language anxiety and English learning motivation. *Education Research International*, 1-8. doi:10.1155/2011/493167
- Scovel, T. (1978). The effect of affect on foreign language learning: A review of the anxiety research. *Language Learning*, 28(1), 129-142.

The Relationship Between Instructor's Physical Attractiveness, Teaching Attractiveness And Student Motivation During Live Lectures

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Abstract

Communication behaviors, physical appearance, instructional skills of the instructor during teaching influence students' participation level and willingness of interaction with the instructor. It is claimed that positive evaluation of teaching attractiveness results in higher level of student participation and interaction motivation. Live instruction sessions require physical preparation of the instructor before the lessons. In addition, during live instruction, the instructor has to give great importance to his/her verbal and nonverbal communication behaviors. The aim of this study is to investigate the relationship between live session instructor's physical attractiveness, teaching attractiveness, and student motivation. The sample of this research was designed as relational research design. The sample includes 159 students who registered live broadcast courses at Sakarya University Faculty of Communication during December 2016. The students who participated in the research evaluated the lecturers who gave lectures on the live broadcast for the physical attractiveness and teaching attractiveness dimensions through a questionnaire. Participant students also answered questions about learning motivation through the same questionnaire. In the analysis of the data, correlational (Pearson) analysis and simple linear regression analysis were used to reveal the relationship and to predict a dependent variable based on predictive variables. The results show that there is a significant positive relationship between the instructor's physical attractiveness and student motivation level. Besides, the results revealed that there is a significant positive relation between teaching attractiveness and student motivation level. Moreover, linear regression analysis results illustrate that physical attractiveness predicts %39,7 of the student motivation level, and teaching attractiveness predicts %55,4 of the student motivation level.

Keywords: *Instructor attractiveness, online instruction, physical attractiveness, teaching attractiveness, student motivation.*

Introduction

The communication between the student and the instructor is a mutual interaction process based on verbal and non-verbal messages (Bekiari and Spyropoulou, 2016). Communication behaviors of the instructor during teaching influence students' participation level and willingness of interaction with the instructor. (Claus et al., 2012, 162). Non-verbal communication codes, such as the instructor's tone of voice, pace, eye contact, tense body and gestures and mimics may have an influential role on creating a positive atmosphere in the classroom (Hsu, 2006). Frymier and Houser (2000) have mentioned that the relationship between the instructor and the student can be improved related to the mutual communication skills of both sides. Understanding the communication behaviors of the instructor and the student not only helps the improvement of their mutual relationship but also gives an idea to the instructor about providing a quality learning environment (Weiss and Houser, 2007). Especially, the instructor's closeness, reliability, the ability of a sense of humor and physical attractiveness have a positive influence on students' participation in the class (Claus et al., 2012:162). This also helps students arrange their responsibilities towards the instructor so has a direct influence on the learning process (Westfall, Millar and Walsh, 2016:162). Interpersonal attractiveness is thought to be a distinctive factor for the improvement and the continuity of the relationships in social environments (Bekiari and Spyropoulou, 2016). At this point, interpersonal attractiveness shows the communication quality between the recipient and the sender (Curnalia, 2016). Individuals' sense of resemblance, past experiences, values, and beliefs influence the perception of attractiveness. For example, people may come across people who have similar behaviors with them. That's why they see them as attractive and have positive feelings towards them (Batoll and Malik, 2010). McCroskey and McCain (1974) take the interpersonal attractiveness into consideration in terms of three dimensions as physical, social and duty. Physical attractiveness includes being good-looking, having sexual attraction and being beautiful/handsome. The individual's face, weight, physical characteristics, being athletic should be evaluated in terms of physical attraction dimension (Curnalia, 2016). In his study, Westfall (2015, 9) has investigated the influence of the instructor's physical attractiveness on his/her instructional skills and has determined that students graded the physically attractive instructors as more skillful and more motivating. Similarly, in their research, Bokek-Cohen and Davidowitz (2008)

have determined the important influence of the instructor's physical attractiveness that was graded in the instructors' evaluation questionnaires of the students. Ünal-Çolak and Kobak (2011) have mentioned the positive relation between the instructor's physical attractiveness and student motivation. Myers and Huebner (2011) have determined that interpersonal attractiveness of instructors is a positive motivation for students who want to communicate with them. In addition to this, the instructional attractiveness of the instructor should also be questioned.

The student is getting ready for motivation to communicate with the instructor by testing the variables which are influential on their communication behaviors (Weiss and Houser, 2007:216). The instructor should have alternatives/alterations during the teaching process. The instructor's intelligence, his/her knowledge of the lesson content, his/her pedagogical knowledge, communication competence and general experience are all important during the teaching process. All these factors also influence the verbal and non-verbal communication behaviors of the instructor during the teaching process (McCroskey, Valencic and Richmond, 2004). An effective education requires positive instructional behaviors of the instructor such as closeness, clearness, and temperament and this is more influential on learning (Goodboy and Myers, 2008:154).

Student motivation is about the participation willingness of the student during the learning process. The instructor's advisor role, information source role, teaching role and technical role are among the factors that influence the student motivation (Vatansever Bayraktar, 2015). An instructor should be well-organised for the lesson, should emphasize the importance of the academic success, should be sure that students get what is taught in the lesson, should involve all students into the learning activities, should be knowledgeable about what s/he is teaching, should have presentation skills, should give sufficient feedback to the students in order to understand what they have learnt and what they have not, and should strengthen students' positive behaviours. Moreover, an instructor should choose different methods by considering the learning environment and should realize the education with visual-audial equipment (Vatansever -Bayraktar, 2015 cited from Balci, 1993; Ünal and Ada, 2003).

Sakarya University provides some live instruction sessions within the scope of SaüTv. Different university students have the chance of having these lessons via Massive Open Online Courses (MOOCs) and they can watch videos of these lessons whenever and wherever they want. With the MOOCs Project that has been brought out as a new modal in digital education, students who study at Sakarya University can register at "http://saux.sakarya.edu.tr" address, and they can have lessons in different fields. Aiming to realize effective communication, these lessons could also be from different faculties of the university. During the 2016-2017 fall semester, four live instruction sessions were carried out by instructors with different titles within the scope of Sakarya University, Faculty of Communications. One of these lessons was carried on as an object lesson. Live instruction sessions are lessons for which instructors get ready physically beforehand and for which they should be careful about their verbal and non-verbal communication behaviors. At this point, the instructor should have a brief preparation just before the live session. The flow of the course is live on the web and it is given as an in-class lesson. The live course is also supported with extra education materials when needed. What is more, the instructor is ready at the location where the live session takes place. In these lessons, in which synchronous education is adopted, there is also an interaction between the instructor and the student with questions and answers. Demographical characteristics of the instructor are as the following; 1 Male and 3 Females in terms of sex variable, 1 Professor Doctor, 1 Associate Professor and 2 Assistant Professors in terms of title variable.

Objective

The aim of this study is to investigate the relationship between the important role of instructor's physical attractiveness, teaching attractiveness, and student motivation in a live session course environment. For the purposes of the study, following questions are answered.

1. Is there a relationship between the physical attractiveness of the live session instructor and student motivation level?
2. Is there a relationship between the teaching attractiveness of the live session instructor and student motivation level?
3. Is the physical attractiveness of the live session instructor a predictor for the student motivation level?
4. Is the teaching attractiveness of the live session instructor a predictor for the student motivation level?

Problem Statement

Massive Open Online Courses have been increasing day by day. When compared to face to face education, more care and attention should be given for these courses as they are able to be far-reaching and they make it possible for students to access the content of the courses when and where they want. The instructor-student relationship is influenced by different variables in instruction communication. Besides the physical appearance and behaviors of the instructor, his/her verbal and non-verbal behaviors during the session could also be a determinant of this relationship. Live instruction sessions are lessons for which instructors get ready physically beforehand and for which they should be careful about their verbal and non-verbal communication behaviors. This situation may

change the students' perception for the instruction and the lesson. Moreover, it may alter students' interest in the lesson, their desire to learn and motivation. Though the relationship between the interpersonal attractiveness, especially the physical attractiveness, of the instructor and the student motivation was investigated in prior research, there has been no study about the evaluation of the physical and teaching attractiveness in terms of the live session courses and their influence on students' motivation. In addition, live session instructors experience a self-evaluation process. For this reason, different from the traditional lessons, the relationship between how instructors are evaluated by students and how their evaluations influence their learning motivation in live sessions should be questioned. In this study, the physical and teaching attractiveness of the instructor in live broadcasting sessions has been investigated.

Method

This study was designed as a descriptive survey model. Descriptive survey models aim to describe a situation in the past or now as it is (Karasar, 2004, 77). As for the purposes of the study, descriptive survey model was chosen to describe the relationship between the motivation level of the students during the live sessions and physical and teaching attractiveness of the instructor as it is.

Sample

In this study, a random sampling method was used. The study sample consists of 159 students studying at the Communication Faculty of Sakarya University. Students in the study are all obliged to take different lessons from four different instructors. Since there are no instructors who teach lessons in the same class, they have been evaluated by different students in live sessions who have been ready during the shot of the lessons. %78 of these students are female, %78 of them are males and %3 of them did not mention their sex. The age range of the participants is between 17 and 28, but the majority of them is (%76) between 18 and 21.

Data Collection

In the study, a questionnaire form has been used to collect the data. The form has been delivered to the students just before the live session and they have been asked to evaluate the related lesson and the instructor. Questions about the physical attractiveness dimension in the questionnaire form have been taken from the scale that was developed by McCroskey and McCain (1974). On the other hand, questions about the instructional attractiveness and motivation in the questionnaire form have been taken from the scale that was developed by Ellis (2000). Following the experts' approval for the first draft of the questionnaire, the revising process started. Finally, the questionnaire has consisted of 7 questions for physical attractiveness, 13 questions for teaching attractiveness and 8 questions for motivation level. The questionnaire items have been presented to the participants as a 5-point Likert-type scale with intervals of 1 Strongly Disagree to 5 Strongly Agree. Participants have responded to the items face-to-face.

Internal consistency reliability of the new questionnaire form has been determined as high as .956. Cronbach's Alpha values of sub-categories have been calculated as .860 for physical attractiveness, .896 for teaching attractiveness, and .875 for student motivation. These results illustrated that each categories' internal consistency reliability is over .40, hence internal consistency reliability is high.

Data Analysis

Data of the questionnaire of this study have been analyzed with SPSS 15.0 Windows version. First of all, the data set has been examined for possible data errors or data deficient. After being sure about the correct data input, unanswered questions by participants for any reasons have been examined. As a result of this examination, most of the items have been determined to be answered, less than %5 for unanswered ones. The result supports the impression that the participants did not experience any difficulty to comprehend the items.

In the study, correlational (Pearson) analysis and simple linear regression analysis were used to reveal the relationship between variables and to predict dependent variable based on predictive variables.

Findings

Mean Value for the Physical Attractiveness, Teaching attractiveness and Motivation

The mean value of the participants' responses to the questions instructor's physical attractiveness, teaching attractiveness and motivation is seen in Table 1.

Table 1: Mean Value for the Physical Attractiveness, Teaching Attractiveness, and Motivation

	N	Mean
Physical attractiveness		
S/he is very beautiful/handsome	159	3,38
S/he cares her/his personal cleaning	158	4,04

S/he is physically attractive	159	3,26
Her/his tone of voice and stress take my attention	158	3,63
S/he speaks Turkish fluently	158	4,02
Her/his clothes suit her/him well	159	3,84
S/he cares her/his clothing	159	4,04
Teaching attractiveness		
S/he is respectful to class hours	158	3,73
S/he is proficient in her/his subject	159	4,19
S/he is fair when giving word to students	158	4,20
I rely on her/his knowledge about the course	159	4,19
S/he helps me correct my mistakes.	159	3,82
S/he manages time well.	159	3,94
I have freedom of speech during her/his course	158	3,94
S/he keeps eye contact during the lesson	159	4,01
S/he never moves to a new subject before the previous one is comprehended	159	3,69
S/he uses visual materials during the course	159	4,15
Her/his answers to my questions satisfy me	159	3,87
S/he is always well-prepared for the course	159	4,13
I know her/his evaluation criteria	158	3,65
Motivation		
I can transfer theoretical information I get during the course in my daily life	159	3,55
I think this course is important	157	3,75
The course meets my expectations	158	3,55
S/he manages class discussions successfully	159	3,72
The presentation of the course and the content attract my attention	159	3,62
The content of the course meets my expectations and needs	158	3,57
The content of the course encourages me to think in different areas	159	3,61
I am appreciated when I am successful in the course	158	3,39

5 point Likert-type scale items are formulated as 4/5=0.80 and evaluated as between 1 and 1.80 “I strongly do not agree”, between 1.81 and 2.60 “I do not agree”, between 2.61 and 3.40 “I am not sure”, between 3.41 and 4.20 I agree, 4.21 and over is “I strongly agree”. When mean values are analyzed, it is seen that students did not choose the “I do not agree” option for any of the scale items except for the item 1 and 3 in physical attractiveness category (1. S/he is very beautiful/handsome. 3. S/he is physically attractive. On the other hand, it is seen that students did not choose “I strongly agree” option for any of the scale items.

Relationship between Physical Attractiveness and Student Motivation

In the study correlation analysis (Pearson) is used to reveal the strength of relationship between physical attractiveness and motivation.

Table 2. Relationship between Physical Attractiveness and Student Motivation Value

		Physical attractiveness	Motivation	
Physical attractiveness	Pearson Correlation	1	,630**	The
	Sig. (2-tailed)		,000	
	N	159	159	
Motivation	Pearson Correlation	,630**	1	The
	Sig. (2-tailed)	,000		
	N	159	159	

** . Correlation is significant at the 0.01 level (2-tailed).

findings show that there is a significant positive ($r = .630$) relationship between instructor’s physical attractiveness and student motivation at the level 0.01. Namely, when the level of physical attractiveness value increases, student motivation level increases, too.

The Relationship between Teaching Attractiveness and Motivation Level

In the study correlation analysis (Pearson) is conducted to reveal the strength of relationship between teaching attractiveness and motivation level.

Table 3. The Relationship between Teaching Attractiveness and Motivation Level

		Teaching attractiveness	Motivation
Teaching attractiveness	Pearson Correlation		1
	Sig. (2-tailed)		,744**
	N	159	159
Motivation	Pearson Correlation	,744**	1
	Sig. (2-tailed)	,000	
	N	159	159

** . Correlation is significant at the 0.01 level (2-tailed).

The findings illustrate that there is a significant positive ($r = .744$) relationship between instructor’s teaching attractiveness and student motivation at the level 0.01. In other words, when the level of teaching attractiveness increases, student motivation level increases, too.

The Predictability of Student Motivation Based on Instructor’s Physical Attractiveness

A simple linear regression analysis is calculated to predict dependent variable based on predictive variable. (Gürbüz and Şahin, 2014, 260). In this study, linear regression analysis was conducted to predict student motivation based on instructor’s physical attractiveness.

Table 4. The Predictability of Student Motivation Based on Instructor’s Physical Attractiveness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,630a	,397	,393	,66926

a. Predictors: (Constant), physical attractiveness

b. Dependent Variable: motivation

A significant regression equation is found ($F(1,157) = 103,456$, $p < .000$), with an R^2 of .397. Linear regression analysis illustrates that physical attractiveness predicts %39,7 of the student motivation level.

Table 5. ANOVA

		ANOVA				
Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	46,338	1	46,338	103,456	,000b
	Residual	70,321	157	,448		
	Total	116,659	158			

a. Dependent Variable: motivation

b. Predictors: (Constant), physical attractiveness

The Predictability of Student Motivation Based on Teaching Attractiveness

In this study, linear regression analysis was conducted to predict student motivation based on teaching attractiveness.

Table 6. The Predictability of Student Motivation Based on Teaching Attractiveness

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	,744a	,554	,551	,57589

a. Predictors: (Constant), öğretim çekiciliği

b. Dependent Variable: motivasyon

A significant regression equation is found ($F(1,157) = 194,758$, $p < .000$), with an R^2 of .554. Linear regression analysis illustrates that teaching attractiveness predicts %55,4 of the student motivation level.

Table 7. ANOVA

		ANOVA				
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Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	64,591	1	64,591	194,758	,000b
	Residual	52,068	157	,332		
	Total	116,659	158			

a. Dependent Variable: motivation

b. Predictors: (Constant), teaching attractiveness

Results And Discussions

Communication between an instructor and students is an interactive process includes verbal and non-verbal messages. (Bekiari ve Spyropoulou, 2016). The instructor's communication abilities have a direct effect on student enthusiasm for participation and interaction (Claus et al., 2012, 162).

As a part of interpersonal communication, attractiveness is a vital element to sustain relationships (Bekiari and Spyropoulou, 2016). From this perspective, attractiveness increases the effectiveness of communication between the sender and the receiver. (Curnalia, 2016).

According to McCroskey and McCain (1974) attractiveness can be categorized into three as physical, social and professional. Physical attractiveness is related with good looking, being sexy, being beautiful/handsome. Westfall (2015, 9) claims that instructors physical attractiveness change students' perception about their instructor. His study revealed that students perceive their instructor as more talented and encouraging when they find him/her more attractive.

On the other hand, the instructor's intelligence, proficiency, pedagogical knowledge, and experience are also determinant on student motivation level. (McCroskey, Valencic ve Richmond, 2004). Further, effective education requires sincerity, clarity, and humor of the instructor (Goodboy ve Myers, 2008, 154).

Other studies on student motivation highlight that student motivation is closely related with instructors teaching approach and methods, management skills and guidance abilities. (Vatansever Bayraktar, 2015). Organized, success oriented and presentable instructors raise the level of student motivation (cited in Vatansever -Bayraktar, 2015 from Balcı, 1993; Ünal ve Ada, 2003).

Sakarya University provides some live online lessons via SaüTv. These lessons, which are designed as Massive Online Open Courses can be taken by other university students and can be, followed anytime anywhere. In Communication Faculty four different courses are provided online by four different instructors. The flow of the lessons are similar to traditional in-class lessons, and when necessary supplementary materials are used. During these sessions, there is the possibility of instructor-student interaction since these lessons are broadcasted in a real class setting. Live session instruction requires preparation of the instructor both physically and instructional. In relation to this context, the aim of this study is to investigate the relationship between live session instructor's physical attractiveness, instructional attractiveness, and student motivation.

In this study, simple random sampling is used and 159 Communication Faculty students studying at Sakarya University participated in the research. Participants answered a survey investigating instructor physical attractiveness, instructional attractiveness, and student motivation. All surveys were conducted face to face. To reveal the relationship between physical attractiveness and student motivation, instructional attractiveness, and student motivation correlation (Perason) analysis was used. Following, a linear regression analysis was conducted to uncover whether physical attractiveness and instructional attractiveness predicts student motivation.

Results showed that there is a significant positive relationship between the instructor's physical attractiveness and student motivation. Besides, the results revealed that there is a significant positive relation between instructional attractiveness and student motivation. Moreover, linear regression analysis results illustrate that physical attractiveness predicts %39,7 of the student motivation level and instructional motivation predicts %55,4 of the student motivation level.

The results of this study are similar to prior studies that investigate the same questions for traditional teaching. However, there is still a limited research investigating the effect of physical and instructional attractiveness on student motivation during live sessions. Further research may question the factors that affect student motivation not in a classroom setting during a live broadcast, but while watching these lessons outside the classroom.

References

- Balcı, A. (1993). Etkili Okul-Kuram, Uygulama ve Araştırma. Ankara: Ankara Üniversitesi Yayınları. Yavuz Dağıtım.
- Batooll, S.,& Malik, N. I. (2010). Role of Attitude Similarity and Proximity in Interpersonal Attraction among Friends. *International Journal of Innovation, Management and Technology*,1 (2), 142-146.
- Bekiari, A., & Spyropoulou, S. (2016). Exploration of Verbal Aggressiveness and Interpersonal Attraction through Social Network Analysis: Using University Physical Education Class as an Illustration. *Open Journal of Social Sciences*,4, 145-155.

- Bokek-Cohen, Y., & Davidowitz, N. (2008). Beauty and Teaching Evaluation: A comparison between Female and Male College Professors. *Problems of Education in the 21st Century*, 7, 15-30.
- Claus, C.J., Booth-Butterfield, M., & Chory, R.M. (2012). The Relationship Between Instructor Misbehaviors and Student Antisocial Behavioral Alteration Techniques: The Roles of Instructor Attractiveness, Humor, and Relational Closeness. *Communication Education*, 61(2), 161-183.
- Curnalia, R. (2016). *Interpersonal Attraction. Interpersonal Attraction from Insight Innovation: Applying Communication Theory in Our Webs 2.0*. Lives. Kendall Hunt Publishing.
- Ellis, K. (2000). Perceived teacher confirmation. *Human Communication Research*, 26, 264-291.
- Frymier, A. B. and Houser, M. (2000). The teacher-student relationship as an interpersonal relationship. *Communication Education*, 49, 207-219.
- Goodboy, A.K. and Myers, S.A. (2008). The Effect of Teacher Confirmation on Student Communication and Learning Outcomes. *Communication Education*, 57 (2), 153-179.
- Gürbüz, S. and Şahin, F. (2014) *Sosyal Bilimlerde Araştırma Yöntemleri*, Ankara: Seçkin Yayıncılık.
- Hsu, L. (2006). The Impact of Perceived Teachers' Nonverbal Immediacy on Students' Motivation for Learning English. *Asian EFL Journal*, 12 (4).
- Karasar, N. (2004). *Bilimsel araştırma yöntemleri*. Ankara: Nobel Yayıncılık.
- McCroskey, J.C., & McCain, T.A. (1974). The Measurement of Interpersonal Attraction. *Speech Monographs*, 41, 261-266.
- McCroskey, J., Valencic, K.M., Virginia P., & Richmond, V.R. (2004). Toward a General Model of Instructional Communication. *Communication Quarterly*, 52 (3), 197-210.
- Myers, S.A., & Huebner, A.D. (2011). The relationship between students' motives to communicate with their instructors and perceived instructor credibility, attractiveness, and homophily. *College Student Journal*, 45, 84-91.
- Ünal-Colak, F., & Kobak-Uzun, K. (2011). Determining interpersonal attraction in educational environment and the relation with motivation. *International Journal on New Trends in Education and Their Implications*, 2(1), 47-56.
- Ünal, S., & Ada, S. (2003). *Sınıf Yönetimi*. İstanbul: Marmara Üniversitesi Matbaası.
- Vatansever -Bayraktar, H. (2015). Sınıf Yönetiminde Öğrenci Motivasyonu ve Motivasyonu Etkileyen Etmenler. *International Periodical For the Languages, Literature and History of Turkish or Turkic*, 10 (3), 1069-1090.
- Weiss, S.D., & Houser, M.L. (2007). Student Communication Motives and Interpersonal Attraction Toward Instructor. *Communication Research Reports*, 24 (3), 215-224.
- Westfall, R.S. (2015). *Effects of Instructor Attractiveness on Classroom Learning*. Unpublished Master thesis. University of Nevada, Las Vegas.
- Westfall, R., Millar, M., & Walsh, M. (2016). Effects of Instructor Attractiveness on Learning. *The Journal of General Psychology*, 143 (3), 161- 171.

The Relationship Between The Status Of Psychological Well Being And Psychological Performance Of Handball Players

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Abstract

The purpose of this research, pre-competition handball team in Turkey to investigate the psychological performance status and psychological well being. The researcher's universe consisted of 400 athletes, 168 women and 232 men, aged between 18 and 30, on 22 provinces, including 8 super league, 8 1st place, 3 2nd place, 3 regional league from 6 geographical regions.

As means of data collection in the survey; Psychological well-being scale, psychological performance scale and personal information form were used. Statistical analyzes were performed with the SPSS 20.0 package program on personal information form, psychological well-being scale and psychological performance scale. The personal information and inventory total scores and factor scores for the candidates were determined by determining frequency (f) and percentage (%) values. Pearson Moments Correlation Analysis (r) analysis was applied to reveal the relationship between the scores obtained from the scales. (B)

When the relationships between subscales of psychological well-being and psychological performance sub-dimensions are examined, self-confidence, attention control and attitude control between autonomy and self-confidence and visualization and imagination, between environmental domination and self-confidence, attention control and motivation level, between individual development and self-confidence, visualization and imagination, motivation level, positive energy and attitude control positive relationships between positive self-acceptance and positive energy were found.

As a result; the psychological well-being and psychological well-being of the athletes will be determined, the factors that will affect the performances of the athletes will be removed, and their performance will be influenced to the upper levels in the positive direction.

Keywords: *Psychological good, Psychological performance, Handball, Athlete*

Introduction

It is strengthening the psychological endurance of the individual to exhibit a strong appearance in the face of difficult living conditions and to be able to flip the difficult situations (Kararımak, Siviş Çetinkaya, 2011, pp. 30-43). The need for a detailed investigation of the concept of psychological well-being has emerged as people need to have a strong psychologically strong structure in their struggle against adverse situations (Önder, Gülay, 2008, p.192-197).

Psychological wellness involves the quality of one's relationship with other people. It shows whether the person is conscious of their life purpose and whether they are aware of their potential (Ryff, Keyes, 1995, p.719 - 727). In addition, we see that psychological well-being is defined as a concept that both materially and spiritually means that a person has a comfortable life and has the necessary qualities for it. The concept of psychological well-being reflects the concept of self-positive perception, the establishment of safe and warm relationships with other people around it, independent and autonomous decisions, the shaping of the environment to fulfill personal needs and desires, and the purpose and meaning of the life (Baysoy, 2014).

Ryff and Keyes (2002, p.161-180) are concerned about the psychological well-being, the individual's awareness of the aims of life, the formation of relationships among qualified people, the recognition of positive self, the acceptance of limitations and self- (Keyes, Shmotkin, Ryff, 2002, p.1007-1022), which is characterized by the ability to respond in a manner that is self-sustaining and entrepreneurial, aware of its capabilities and evolving.

In today's sport, excellence in physical fitness is not considered alone enough to bring sporting performance to the top. The athlete also has a psychological capacity and is at least as important as the physical direction. It is for this reason that the athletes experiencing changes in the emotional direction are unable to catch the expected success despite being physically ready (Tavacıoğlu, 1999). Besides the physiological and physiological capacities of many

top athletes; they are also thought to have excellent skills in psychological capacities such as motivation, managing their concerns, concentrating and determining goals (Koç, 2004).

Ramirez; psychological wellbeing, ability to heal quickly from disease, depression, alterations, or worse situations; to be able to recover itself, to be able to easily return to the old one after it has been torn; elasticity. This concept is defined as a talent, a psychological quality and contributes to the continuation of healthy development and also has some features such as being able to cope with such situations when encountering negative situations. (Masten, 1994, p. 3-25).

Individuals with a high level of psychological well-being are more attached to daily activities and jobs, keep their lives under control, and view unexpected changes as opportunities for improvement. Persons can easily determine what they want to do in their lives, believe that they can prevent problems from emerging, and have the power to be better than the past when correcting the present situation (Florian, Mikulincer, Toubman, 1995, p.687-695). In individuals with low levels of resistance, resistance to distance, external control and change is seen (Klag, Bradley, 2004, p.137-161).

When we consider the above information as a whole, it is seen that concepts of psychological well-being and psychological performance can be effective in different dimensions and levels in different areas of life. When the literature is examined, studies on psychological well-being and psychological performance are often integrated separately or in other contexts (Masten, Reed, 2002, p.74-88, Connor, Davidson, 2003, p.76-82, Noorafshan, Jowkarb, Hosseini, 2013, p.900-904, Sagone, Caroli, 2013, p.838-845, Gürkan, 2006, Bahadır, 2009, Güloğlu, Kararmak, 2010, Sezgin, 2012, s.489-502, Kirimoglu, Filazoğlu 2003, pp. 822-848, Falkenström, 2010, p.305-310, Schmutte, Ryff, 1997, pp.115-127, Ozen, 2010, pp. 46-58, Brown, Ryan, p.549-559, Sarıcaoğlu, 2011, Jeweler, 2012, p.1-24, Eksioğlu, 2011). However, no studies have been found on the psychological well-being and psychological performance levels in sports science. From this point; it is thought that this study made possible that this shortcoming in the field of sports science could lead to a different perspective on the field. The general aim of working in this context is to examine the psychological well-being and psychological performance of handball players before competition.

Material And Method

Methods

Studying Group

This research is in the relational screening model. This screening model can be defined as "... research models aimed at determining the presence and / or degree of exchange between two and more variables" (Karasar, 2015, pp.49-53).

Research; the descriptive qualities of handball players are due to the fact that the power to predict the psychological performances of their psychological well being and the demographic characteristics of the candidates are determined in the context of their relationship.

Data Collection Tools

Data collection tools used in research; Psychological well-being scale, psychological performance scale and socio-demographic information form were applied.

Creation of Voluntary Groups

Turkey Handball Federation of study within the Super League, Div 1, 2 League and regional ligte we played handball handball players from the 681 randomly method selected 400 athletes participated.

Table 1. Socio-Demographic Characteristics of the Participants

	Değişkenler	N	%
Gender	Male	235	58,8
	Female	165	41,2
Age	18-21	213	53,3
	22-25	92	23,0
	26-30	67	16,8
	31 and above	28	7,0
Age of Sport	1-5	58	14,5
	6-10	208	52,0
	11 and above	134	33,5
Position	Goalkeeper	55	13,8
	Right Playmarker	52	13,0

	Left Playmarker	62	15,5
	Middle Playmarker	48	12,0
	Right Wings	67	16,8
	Left Wings	51	12,8
	Pivot	65	16,3
League	Super League	139	34,8
	1. League	158	39,5
	2. League	69	17,3
	Regional League	34	8,5

Socio-Demographic Information Form

The socio demographic information form contains 5 questions in order to obtain participants' age, gender, sport age, position and league level information.

Psychological Well-Being Scale

Ryff (1989, pp. 35-55); autonomy, environmental dominance, individual development, positive relationships with others, life goals and self-acceptance. The scale consists of 84 items. Each sub-dimension has 14 items. This is a self-report measure measuring the characteristics of the psychological well-being and giving information about the individual. (1) I do not agree at all, (2) I do not agree a little, (3) I do not agree very little, (4) I do not agree very much, (5) I agree a little and (6) about half of the substances in a subscale are reverse coded. The adaptation of the scale to the Turkish language was done by Cenkseven (Cenkseven, 2004). Reliability studies were conducted on 475 university students. Correlations of 84 items with the total score from the Psychological Well-Being Scale. 25 to 57. When we look at the correlations of the total score of each item with the total score, the values are 42-70 for positive relations with others, .38-.60 for autonomy, .32-.63 for environmental dominance, .38-.61 for individual development, and between .37 and .63 for self-acceptance. Internal consistency coefficients (Cronbach Alpha) of the scale were found to be .83, .73, .76, .76, .76, .76, and .79, respectively. The overall internal consistency coefficient of the Psychological Well-Being Scale was .93. The correlation coefficients for test retest reliability were found to be .74, .77 for autonomy, .77 for environmental dominance, .74 for individual development, .75 for life purpose and .76 for self-acceptance. It was also determined that the test-retest correlation coefficient for the total score was .84.

Psychological Durability Scale

Loehr J.E. Psychological Performance Inventory (PPI), developed by the American Psychological Association, was used (Loehr, 1986) to produce the profile of the athlete's mental skills. 5-Likert-type closed-end scale question type answer inventory options; "Always", "often", "sometimes", "rarely" and "never". (Loehr, 1986). Studies on adaptation of PPE to Turkish have been made. The internal consistency coefficient for the Turkish version of the scale was 0.70, 0.63 for negative, 0.43 for attention control, 0.53 for visualization and imaging control, 0.62 for motivation level, 0.53 for positive control and 0,65 for attitude control (p <0 , 01) (The Whoqol Group, 1996, pp. 354-356).

Analysis of data

The data obtained from the Personal Information Form, Psychological Resilience and Psychological Well-being scale were coded and entered into the SPSS 20.0 package program and the analyzes were made through this program. The personal information and inventory total scores and factor scores for the candidates were determined by determining frequency (f) and percentage (%) values. Pearson Moments Multiplication Correlation analysis (r) was applied to reveal the relationship between scores obtained from the scales. (B)

Findings

Table 2. Descriptive statistics of the players' responses to the questionnaire

	N	Minimum	Maximum	X±SD
Autonomy	400	29.00	65.00	49.98±5.96
Environmental Dominance	400	36.00	69.00	52.44±5.89
Individual Development	400	34.00	69.00	48.22±5.82
Positive Relations with Others	400	35.00	68.00	50.85±5.92

Life Goals	400	28.00	65.00	47.06±6.52
Self-acceptance	400	32.00	65.00	49.29±6.19
Self-Efficacy	400	10.00	30.00	22.32±4.50
Negative Energy	400	9.00	27.00	18.13±3.51
Attention control	400	8.00	28.00	18.24±3.90
Visualization and Imaging	400	8.00	30.00	21.40±4.64
Motivation Level	400	9.00	30.00	21.40±4.30
Positive Energy	400	9.00	30.00	21.17±3.59
Attitude Control	400	9.00	30.00	21.58±4.35

As seen in Table 2; the averages of the self-efficacy subscale of the athletes were 49,98, the average of the environmental dominance score was 52,44, the average of the individual development score was 48,22, the average of the positive relation scores was 50,85, the mean of the life purpose score was 47 , Mean scores of self-acceptance score of 49,29, mean scores of psychological well-being total score of 297,84, scores of psychological performance subscale scores of self-confidence score 22,32, negative scores of energy score 18,13, 21,40 for the visualization and imaging score, 21,40 for the motivation level score, 21,17 for the positive energy score, 21,58 for the attitude control score, and 144 for the psychological performance total score, 144, 22.

Table 3. Correlation Coefficients between the Players' Psychological Well Being and Psychological Performance (n=400)

	1	2	3	4	5	6	7	8	9	10	11	12	13
Autonomy¹	r p N	1 250											
Environmental Dominance²	r p N	.063 .210 400	1 400										
Individual Development³	r p N	.211* .000 400	-.189** .000 400	1 400									
Positive Relations with Others⁴	r p N	.090 .072 400	.011 .827 400	-.048 .335 400	1 400								
Life Goals⁵	r p N	-.034 .503 400	-.016 .744 400	-.004 .931 400	-.120* .016 400	1 400							
Self-Acceptance⁶	r p N	-.063 .212 400	-.058 .245 400	.068 .172 400	-.010 .848 400	-.042 .403 400	1 400						
Self-Efficacy⁷	r p N	.116* .020 400	.107* .032 400	-.143** .004 400	.094 .060 400	-.194* .000 400	.078 .118 400	1 400					
Negative Energy⁸	r p N	.035 .486 400	.065 .194 400	-.094 .061 400	.088 .079 400	-.060 .229 400	.039 .432 400	.205** .000 400	1 400				

Attention Control⁹	r	-.052	.116*	.012	.060	-.106*	.022	.200**	.384**	1				
	p	.298	.020	.806	.228	.035	.661	.000	.000					
	N	400	400	400	400	400	400	400	400	400	400			
Visualization and Imagery¹⁰	r	.106*	.043	-.151**	-.079	-.025	.054	.415**	-.177**	-.309**	1			
	p	.035	.393	.002	.114	.625	.284	.000	.000	.000				
	N	400	400	400	400	400	400	400	400	400	400	400		
Motivation Level¹¹	r	.067	.109*	-.174**	-.018	-.044	.019	.558**	.012	-.071	.621**	1		
	p	.180	.029	.000	.712	.385	.709	.000	.811	.156	.000			
	N	400	400	400	400	400	400	400	400	400	400	400	400	
Positive Energy¹²	r	.068	.065	-.137**	-.065	-.101*	.108*	.540**	-.057	-.108*	.520**	.496**	1	
	p	.172	.197	.006	.194	.051	.030	.000	.259	.031	.000	.000		
	N	400	400	400	400	400	400	400	400	400	400	400	400	
Attitude Control¹³	r	.099*	.010	-.149**	-.019	-.109*	.077	.656**	.054	.071	.583**	.606**	.567*	1
	p	.051	.844	.003	.708	.029	.125	.000	.281	.158	.000	.000	.000	
	N	400	400	400	400	400	400	400	400	400	400	400	400	400

When Table 3 was examined, it was found that psychological well-being subscales had a low level of positive relationship between self-efficacy and psychological performance subscales ($r = .116$, $p = .020$) and visualization and imagery scores ($r = .106$, $p = .035$).

Self-efficacy scores ($r = .065$, $p = .032$), Attention Control score ($r = .116$, $p = .020$) and Motivation Level score ($r = .109$, $p = .029$), there were significant low levels of positive relationships. Self-efficacy score ($r = .143$, $p = .004$), visualization and imagery score ($r = .151$, $p = .002$) and motivation level score ($r = .174$, $p = .000$), Positive Energy score ($r = .137$, $p = .006$) and Attitude Control score ($r = .149$, $p = .003$) were found to be significantly low on the positive side.

Positive Relationships with Others from Psychological Well-being sub-dimensions and Positive Energy and Attitude Control scores from Psychological performance sub-dimensions did not find any significant relationship with the scores of Self-confidence, Positive Energy, Attention Control, Visualization and Visualization, Motivation Level. Self-efficacy score ($r = .194$, $p = .000$), Attention Control score ($r = .106$, $p = .035$) and Attitude Control score ($r = .149$, $p = .003$) were found to be significantly low on the positive side. Positive energy scores ($r = .108$, $p = .030$) were found to have a significant positive relationship with the psychological well-being subscales of Self-acceptance and psychological performance subscales.

Discussion And Result

The lowest score that can be taken from the psychological wellbeing scale used in this study is 84 and the highest score is 504. The increase in total score shows that psychological well-being increases. (Ryff, 1989, pp. 35-55). When Table 2 was examined, it was determined that the total score of the athletes' psychological well-being scale was moderate according to the scale average scores. On the psychological performance scale, it was found that each area requires special attention between 6-19 points, it needs to be developed between 20-25 points and has a very good skill level between 26-30 points (Loehr, 1986, p.157-160, Sukan 2012). When Table 2 was examined, it was determined that the total scores of the athletes on the psychological performance scale were moderate according to the scale average scores. It is thought that the athletes' psychological well-being and their psychological performance increase before the competition will be more motivated for the competition, they will trust themselves, concentrate more on the competition, determine their goals and objectives, and raise their competition concerns over them.

When the relationships between subscales of psychological well-being scale and psychological performance sub-dimensions are examined in Table 3, self-confidence, attention control and attitude control between self-confidence and self-confidence and visualization and imagination, between environmental domination and self-confidence, attention control and motivation level, between individual development and self-confidence, visualization and imagination, motivation level, positive energy and attitude control positive relationships between positive self-acceptance and positive energy were found.

People are known to be one of the important factors in their interaction with other people outside of themselves. Sport allows a person or team to interact with others, to be influenced or influenced by them. It is thought that individuals can learn to control their negative emotions such as anxiety, fear, aggression, unhappiness and violence while having the opportunity to express their emotions more easily through games and movements. The better one knows himself and his limits, the easier it will be to reach those limits, the more convenient and more equipped.

The psychologist's good state of being, his self-confidence before and after the competition, his positive and negative energy levels according to the changing conditions, his motivation and attitude towards the achievement of positive motivation and attitude It is thought to be influential in the direction.

Ryff and Singer (Ryff, Singer, 2003, p. 15-36) argue that enduring individuals are often better off physically and psychologically than stressful situations. Fredrickson (2001, p.218-226) also states that there is effective evidence that durability is the developmental effect of being psychologically good. The study of university students by Pidgeon and Keyes (2014, p.27-32) concluded that there is a positive and positive relationship between the two concepts. Malkoç and Yalçın (2015, p. 35-43) conducted psychological research on university students; psychological endurance has been achieved.

As a result, it is suggested that people with psychological endurance tend to be good psychologically. Therefore, it is considered that the psychological wellbeing and psychological well-being of the athletes will be determined, the factors that affect the performances of the athletes will be removed and the performance will be increased to the upper levels in the positive direction.

Reference

- Kararımk, Ö, Siviş Çetinkaya, R. (2011). Benlik Saygısının ve Denetim Odağının Psikolojik Sağlık Üzerine Etkisi, Duyguların Aracı Rolü, Türk Psikolojik Danışma ve Rehberlik Dergisi, 4(35), S.30-43
- Önder, A, Gülay, H. (2008). İlköğretim 8. Sınıf Öğrencilerinin Psikolojik Sağlığının Çeşitli Değişkenler Açısından İncelenmesi, Dokuz Eylül Üniversitesi Buca Eğitim Fakültesi Dergisi, s.192-197.
- Ryff, C. D, Keyes, C. L. M. (1995). The Structure Of Psychological Well – Being Revisited, Journal of Personality And Social Psychology, 69: p.719 – 727.
- Baysoy, H. (2014). Psikolojik İyi Olma ve Mükemmeliyetçilik, [Http://Hazelbaysoy.Blogspot.Fr/2014/01/Psikolojik-İyi-Olma-Hali-Ve.Html](http://Hazelbaysoy.Blogspot.Fr/2014/01/Psikolojik-İyi-Olma-Hali-Ve.Html).
- Keyes, C. L. and Ryff, C. D. (2002). Psychological Well-Being in Midlife, in S. L. Willis & J. D. Reid (Eds.), Life in the Middle, Psychological and Social Development in Middle Age, p.161-180.
- Keyes, C. L, Shmotkin, D, and Ryff, C. (2002). Optimizing Well-Being: The Empirical Encounter of Two Traditions. Journal of Personality and Social Psychology, 82, p.1007-1022.
- Tavacıoğlu, L. (1999). Spor Psikolojisi-Bilişsel Değerlendirmeler, Ankara: Bağırhan Yayınevi.
- Koç, H. (2004). Profesyonel Futbolcularda Durumluk Kaygı Düzeylerini Etkileyen Faktörlerin Değerlendirilmesi, Yayınlanmamış Yüksek Lisans Tezi, Dumlupınar Üniversitesi Sosyal Bilimler Enstitüsü, Kütahya.
- Masten, A. S. (1994). Resilience in Individual Development, Successful Adaptation Despite Risk and Adversity, in M. C. Wang, & G. W. Gordon (Eds.), Educational Resilience in Inner-City America, Challenges And Prospects, p. 3-25.
- Florian, V, Mikulincer, M, And Toubman, O. (1995). Does Hardiness Contribute to Mental Health During A Stressful Reallife Situation? The Roles Ofappraisal and Coping. Journal of Personality and Social Psychology, 68(4), p.687-695.
- Klag, S, Bradley, G. (2004). The Role of Hardiness in Stress and İllness, An Exploration of the Effect of Negative Affectivity and Gender, British Journal of Health Psychology, 9: p.137-161.
- Masten, A. S, Reed, M. J. (2002). Resilience in Development. In C. R. Snyder S. J. Lopez (Eds.), The Handbook of Positive Psychology, p.74- 88.
- Connor, K. M, Davidson, J. R. (2003). Development of A New Resilience Scale, The Connor-Davidson Resilience Scale (Cd-Rısc), Depression and Anxiety, 18(2), p.76-82.
- Noorafshan, L, Jowkarb, B, Hosseini, F. S. (2013). Effect of Family Communication Patterns of Resilience Among Iranian Adolescents. Procedia-Social And Behavioral Sciences 84, p.900 – 904.
- Sagone, E, Caroli, M. E. D. (2013). Relationships Between Resilience, Self-Efficacy, and Thinking Styles in Italian Middle Adolescents, Procedia-Social And Behavioral Sciences, 92, p.838-845.
- Gürhan, U. (2006). Grupla Psikolojik Danışmanın Üniversite Öğrencilerinin Yılmazlık Düzeylerine Etkisi, Yayınlanmamış Doktora Tezi, Ankara Üniversitesi Eğitim Bilimleri Enstitüsü, Ankara.
- Bahadır, E. (2009). Sağlıkla İlgili Fakültelerde Eğitime Başlayan Öğrencilerin Psikolojik Sağlık Düzeyleri, H. Ü. Sağlık Bilimleri Enstitüsü, Yüksek Lisans Tezi, Ankara.
- Güloğlu, B, Kararımk, Ö. (2010). Üniversite Öğrencilerinde Yalnızlığın Yordayıcısı Olarak Benlik Saygısı ve

- Psikolojik Sağlık, Ege Üniversitesi Eğitim Fakültesi Dergisi, 11(2), s.73-88.
- Sezgin, F. (2012). İlköğretim Okulu Öğretmenlerinin Psikolojik Dayanıklılık Düzeylerinin İncelenmesi, Kastamonu Eğitim Dergisi, 20(2), s.489-502.
- Kirimoğlu, H, Filazoğlu Çokluk, G. Yıldırım, Y. (2012). Türk Antrenörlerin Yılmazlık Düzeylerinin İncelenmesi, Electronic Journal of Social Sciences, 11(39), s.115-127.
- Özen, Y. (2010). Kişisel Sorumluluk Bağlamında Öznel ve Psikolojik İyi Oluş (Sosyal Psikolojik Bir Değerlendirme), Dicle Üniversitesi Sosyal Bilimler Enstitüsü Elektronik Dergisi (Düsbed), 2(4), s.46-58.
- Brown, K. W, Ryan, R. M. (2003). The Benefits of Being Present, Mindfulness and Its Role in Psychological Wellbeing. Journal of Personality and Social Psychology, 84, p.822-848.
- Falkenström, F. (2010). Studying Mindfulness in Experienced Meditators: A Quasi- Experimental Approach. Personality and Individual Differences, 48, p.305-310.
- Schmutte, P. S, Ryff, C. D. (1997). Personality and Well-Being: Reexamining Methods and Meanings. Journal of Personality and Social Psychology, 73, p.549-559.
- Sarıcaoğlu, H. (2011). Üniversite Öğrencilerinin Psikolojik İyi Olma Düzeylerinin Kişilik Özellikleri ve Öz-Anlayış Açısından İncelenmesi, Yayınlanmamış Yüksek Lisans Tezi, Selçuk Üniversitesi Eğitim Bilimleri Enstitüsü, Konya.
- Kuyumcu, B. (2012). Türk ve İngiliz Üniversite Öğrencilerinin Psikolojik İyi Oluşlar Duygusal Farkındalık ve Duygularını İfade Etmelerinin Ülke ve Cinsiyet Değişkenlerine Göre İncelenmesi, Erzincan Üniversitesi Eğitim Fakültesi Dergisi, 14(2), s.1-24.
- Ekşioğlu, H. (2011). İnanç veya Dünya Görüşüne Sahip Olma Tarzıyla Psikolojik İyi Olma Arasındaki İlişki, Yayınlanmamış Yüksek Lisans Tezi, Cumhuriyet Üniversitesi Sosyal Bilimler Enstitüsü, Sivas.
- Karasar, N. (2015). Bilimsel Araştırma Yöntemi (17.baskı), Ankara, Nobel Yayın Dağıtım, s.49-53.
- Ryff, C. D. (1989). Beyond Ponce de Leon and Life Satisfaction, New Directions in Quest of Successful Ageing. International Journal of Behavioral Development. 12, p.35-55.
- Cenkseven, F. (2004). Üniversite Öğrencilerinde Öznel ve Psikolojik İyi Olmanın Yordayıcılarının İncelenmesi. Yayınlanmamış Yüksek Lisans Tezi, Çukurova Üniversitesi Eğitim Bilimleri Enstitüsü, Adana.
- Loehr J.E. (1986). Mental Toughness Training for Sports Achieving Athletic Excellence, The Stephen Grene Press, New York, p.157-160.
- The Whoqol Group, (1996). What Quality of Life, World Health Forum, 17: p.354-356.
- Sucan, S. (2012). Ferdi ve Takım Sporcularının Yaşam Kalitesinin Psikolojik Performans Üzerindeki Etkisi, Erciyes Üniversitesi Spor Bilimleri Enstitüsü Beden Eğitimi ve Spor Bilimleri Anabilim Dalı, Yayınlanmamış Doktora Tezi.
- Ryff, C.D, Singer, B. (2003). Flourishing Under Fire, Resilience As A Prototype of Challenged Thriving. C. L. M. Keyes & J. Haidt (Eds.), Positive Psychology and The Life Well-Lived, p.15-36.
- Fredrickson, B. L. (2001). The Role of Positive Emotions in Positive Psychology: The Broaden-And-Build Theory of Positive Emotions. American Psychologist, 56, p.218-226.
- Pidgeon, A, Keyes, M. (2014). Relationship Between Resilience, Mindfulness, and Psychological Well-Being in University Students. International Journal of Liberal Arts and Social Science, 2(5), p.27-32.
- Malkoç, A, Yalçın, İ. (2015). Relationships Among Resilience, Social Support, Coping, and Psychological Well-Being Among University Students. Turkish Psychological Counselling and Guidance Journal, 5(43), p.35-43.

The Tpack Model In Teacher Training: Documentary Review

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Abstract

The TPACK model is currently a high-impact advance in teacher training in terms of teachers' technological and pedagogical content knowledge. These basic dimensions, as well as the four intersections they generate with reference to Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK), Technological Pedagogical Knowledge (TPK) and Technological Pedagogical Content Knowledge (TPACK), together with the context of training, are considered to constitute a solid model for a good diagnosis of teachers in both initial and ongoing training. This paper presents an analysis of publications in international databases that address the issue of the TPACK model. For this purpose, a review of scientific literature is carried out, applying documentation as a method for systematization. The study presented analyzes 43 contributions between 2014 and 2017, indexed in the WOS and Scopus databases, with TPACK and TPK applied descriptors. A search strategy based on four criteria has been used: target audience, topic, methodological design and main conclusions. The results show that the publications reviewed focus on basic and higher education studies and present methodological designs in which case studies, validation of instruments, quantitative empirical studies and mixed studies predominate. Consequently, among other aspects, the lack of longitudinal studies that show teacher's actions when applying TPACK in their daily practice is deduced from the empirical studies.

Keywords: *TPACK, TPK, Technological Pedagogical Content Knowledge, teacher training, learning, students, ICT.*

Introduction

This paper presents the importance of the TPACK model designed by Mishra & Koehler (2006), with reference to the integration of content knowledge with pedagogical knowledge and technological knowledge when introducing technology into the classroom by teachers. It is also necessary to know the interaction with other knowledge, in terms of Pedagogical Content Knowledge (PCK), Technological Content Knowledge (TCK) and finally Technological Pedagogical Knowledge (TPK).

The relevance of the study lies in the integration of technology by teachers in their teaching practice. Therefore, teacher training in ICT needs to investigate the theoretical bases that guide their application and use in the classroom, both at the disciplinary and pedagogical levels (Shulman, 1986, 1987) together with technological knowledge, on how ICT work in practice (Cabero, 2014).

The TPACK model distinguishes three basic dimensions of training and four intersections between them, identifying a total of seven dimensions, together with the differentiated context of training.

1. Content Knowledge (CK-Content Knowledge): refers to the teacher's knowledge on the specific topics or area to be taught to students, including, but not limited to, concepts, theories, facts, and procedures in their area.
2. Pedagogical Knowledge (PK-Pedagogical Knowledge): knowledge that the teacher has of the pedagogical activities, processes, practices or methods of teaching and learning that could be used in the teaching-learning process and how they relate to the educational goals to be achieved. This includes knowledge about techniques or methods that can be used in the classroom and strategies for student assessment.
3. Technological Knowledge (TK-Technological Knowledge): it refers to the knowledge that teachers have on the different technologies in order to develop their teaching activity. For example, it includes knowledge of operating systems and hardware, how to install programs, and how to create documents. It is also pointed out the importance of the ability to learn and adapt to new technologies.
4. Pedagogical Content Knowledge (PCK-Pedagogical Content Knowledge): it refers to the didactic knowledge about a content area, which implies facilitating the learning of the students about that area.

This includes knowing which teaching approaches and strategies are best suited to the content and how the different elements of the content can be worked on for effective teaching.

5. Technological Content Knowledge (TCK-Technological Content Knowledge): knowledge on how to represent specific concepts with technology, in other words, knowledge on how technology and content are related to each other. Teachers need to know how the contents of their area may be affected by the application of technology.
6. Technological Pedagogical Knowledge (TPK-Technological Pedagogical Knowledge): knowledge of the general pedagogical strategies that can be achieved through technologies. This may include knowing what tools exist for a given task, the skills to choose a tool based on effectiveness or adequacy to the task and the ability to apply pedagogical strategies when using technologies.
7. Technological Pedagogical Content Knowledge (TPACK-Technological Pedagogical Content Knowledge): knowledge of a teacher on how to develop specific teaching strategies on various topics using ICT to facilitate learning. Thus, it is a form of knowledge that goes beyond the three components (content, pedagogy and technology) and includes, for example, knowledge of pedagogical strategies that enable the use of technologies in an effective way to teach content and knowledge of what makes content easy or difficult to learn and how technology can help in some of the problems that students face.

We present the documentary analysis developed around the TPACK model, after analyzing the studies published in databases such as WOS and Scopus during the years 2014 to 2017, about investigations carried out on the technological pedagogical content knowledge.

Methodology

The methodology of the study is based on the documentary analysis, applying documentation as a method of data gathering (Sampieri, Collado & Lucio, 2014). We sought to analyze empirical studies of TPACK model. Documents located in databases such as Web of Science and Scopus were considered. The search strategy applies the “topic” option in “Web of Science (WOS)”, while in Scopus the “article, title, abstract and keywords” option is used. The search period is based on the studies of Castillejos-López, Torres-Gastelú & Lagunes-Domínguez (2014), from 2014 to March 2018. The total amount of papers considered was 43, being TPACK and TPK the applied descriptors, of which a high percentage of the publications belonging to scientific journals and conference proceedings indexed in both databases are repeated. A search strategy based on four criteria has been used: target audience, topic, methodological design and main conclusions, determined by Wollscheid, Sjaastad & Tømte (2016) and Torres-Toukoumidis, Romero-Rodríguez & Pérez-Rodríguez (2018), which facilitate the categorization and synthesis of the information gathered between “TPACK and TPK” on the Web of Science (WOS) and Scopus:

- Audience: childhood education, primary education, secondary education, higher education, training of trainers and general education.
- Topic: ICT integration, ICT attitudes, teacher professional development; TPACK conceptual framework.
- Methodological design: empirical with qualitative techniques, empirical with quantitative techniques, empirical with mixed techniques.
- Main conclusions: effects and consequences of the results.

Outcomes

Audience

Among the publications reviewed, 34.8% of them used samples of students in higher education and Primary Education (30.2%) in the investigations. Moreover, 4.6% are publications aimed at Secondary Education, 11.6% at Childhood Education, 9.4% are general for the general public, and 9.4% are aimed at training of trainers.

Table 1. Distribution of publications by audience

Audience	Publications
Childhood Education [5]	Tarraga-Mínguez, Sanz-Cervera, Pastor-Cerezuela, Fernández-Andrés, 2017; Almería, Orellana, Suárez, Díaz García, 2016; Muñoz & Repiso, 2016; Szeto, Ching, Hong, 2016; Roig-Vila, Mengual-Andrés & Quinto-Medrano, 2015.
Primary Education [13]	Avidov-Ungar & Shamir-Inbal, 2017; Koh, Chai & Lim, 2017; Makenney & Voogt, 2017; Munyengabe, Zhao, He & Hitimana, 2017; Spiteri & Rundgren, 2017; Getenet, Beswick & Callingham, 2016; Hansen, Mavrikis & Geraniou, 2016; Wong, Chai, Zhang &

	King, 2015; Wu, & Wang, 2015; Coklar, 2014, Koh, Chai y Tay, 2014; Lye, Wee, Kwek, Abas & Tay, 2014; Polly, 2014.
Secondary Education [2]	Jones, Schupbach, Harvey, Bulger & Voelker, 2017; Nasution, Sriyati, Riandi & Safitri, 2017.
Higher Education [15]	Gill & Dalgarno, 2017; Yerdelen-Damar, Boz & Aydin-Gunbatar, 2017; Holland & Piper, 2016; Meletiou-Mavrotheris & Prodomou, 2016; Handal, Gómez Chova, López & Candel, 2015; Yelken, Konokman & Tokmak, 2015; Çalik, Özsevgec, Ebenezer, Artun & Küçük, 2014; Celik, Sahin, Akturk, Kopcha & Ottenbreitl, 2014; Kopcha, Ottenbreit-Leftwich, Jung & Baser, 2014; Lee & Kim, 2014; Messina & Tabone, 2014; Mouza, Karchmer-Klein, Nandakumar, Ozden & Hu, 2014; Yurdakul & Coklar, 2014.
Training of trainers [4]	Zhang, Liu & Wang, 2017; Chova, Martínez & Torres, 2016; Okumuş, Lewis, Wiebe & Hollebrands, 2016; Kontkanen, Dillom, Karkkainen, Kukkonen, Valtonen & Vaisanen, 2015.
General education [4]	Cabero, Roig-Vila & Mengual-Andrés, 2017; Cabero & Barroso, 2016; Holland & Piper, 2014; Lefebvre, 2014.

Topic

In terms of keywords and general objectives, 37.2% of the articles deal with the integration of technology, within the framework of the TPACK model. A 9.3% of them focus on students' attitudes towards the use of ICT. In addition, a 32.5% refers to the professional development of teachers, either in their initial or continuous training, in university and non-university contexts. Finally, a 21% refers to deepening the theoretical framework of the TPACK.

Table 2. Distribution of publications by topic

Topic	Publications
ICT integration [16]	Jones, Schupbach, Harvey, Bulger & Voelker, 2017; Munyengabe, Zhao, He & Hitimana, 2017; Chova, Martínez & Torres, 2016; Hansen, Mavrikis & Geraniou, 2016; Holland & Piper, 2016; Okumuş, Lewis, Wiebe & Hollebrands, 2016; Szeto, Ching, Hong, 2016; Kontkanen, Dillom, Karkkainen, Kukkonen, Valtonen & Vaisanen, 2015; Roig-Vila, Mengual-Andrés & Quinto-Medrano, 2015; Coklar, 2014; Lee & Kim, 2014; Lye, Wee, Kwek, Abas & Tay, 2014; Messina & Tabone, 2014; Mouza, Karchmer-Klein, Nandakumar, Ozden & Hu, 2014; Polly, 2014; Yurdakul & Coklar, 2014.
ICT attitudes [4]	Avidov-Ungar & Shamir-Inbal, 2017; Yerdelen-Damar, Boz & Aydin-Gunbatar, 2017; Holland & Piper, 2014; Koh, Chai y Tay, 2014.
Teaching professional development (Digital Competence) [14]	Cabero, Roig-Vila & Mengual-Andrés, 2017; Gill & Dalgarno, 2017; Koh, Chai & Lim, 2017; Makenney & Voogt, 2017; Nasution, Sriyati, Riandi & Safitri, 2017; Spiteri & Rundgren, 2017; Tarraga-Mínguez, Sanz-Cervera, Pastor-Cerezuela, Fernández-Andrés, 2017; Zhang, Liu & Wang, 2017; Almería, Orellana, Suárez & Díaz García, 2016; García Valcárcel & del Pozo, 2016; Getenet, Beswick & Callingham, 2016; Meletiou-Mavrotheris & Prodomou, 2016; Muñoz y Repiso, 2016; Yelken, Konokman & Tokmak, 2015.
TPACK Conceptual Framework [9]	Cabero & Barroso, 2016; Handal, Campbell, Cavanagh & Petocz, 2016; Gómez Chova, López & Candel, 2015; Wong, Chai, Zhang & King, 2015; Wu, & Wang, 2015; Çalik, Özsevgec, Ebenezer, Artun & Küçük, 2014; Celik, Sahin, Akturk, Kopcha & Ottenbreitl, 2014; Kopcha, Ottenbreit-Leftwich, Jung & Baser, 2014; Lefebvre, 2014.

Methodological design

In the methodological design, the most used systematic process is the substantiation through empirical studies with quantitative techniques (48.83%). Regarding qualitative studies, (47.87%), compared to mixed studies (9.3%). Moreover, the instruments used in empirical studies are surveys and questionnaires in an 85%. To a

lesser extent, intervention and instrument validation studies also appear. Furthermore, the samples size is highly variable, meaning that there is no common sampling size of the different studies.

Table 3. Distribution of publications according to the methodological design

Methodological design	Publications
Empirical with qualitative techniques [18]	Avidov-Ungar & Shamir-Inbal, 2017; Gill & Dalgarno, 2017; Jones, Schupbach, Harvey, Bulger & Voelker, 2017; Koh, Chai & Lim, 2017; Munyengabe, Zhao, He & Hitimana, 2017; Spiteri & Rundgren, 2017; Chova, Martínez & Torres, 2016; Hansen, Mavrikis & Geraniou, 2016; Meletiou-Mavrotheris & Prodomou, 2016; Okumuş, Lewis, Wiebe & Hollebrands, 2016; Szeto, Ching, Hong, 2016; Gómez Chova, López & Candel, 2015; Kontkanen, Dillom, Karkkainen, Kukkonen, Valtonen & Vaisanen, 2015; Wong, Chai, Zhang & King, 2015; Kopcha, Ottenbreit-Leftwich, Jung & Baser, 2014; Lee & Kim, 2014; Lefebvre, 2014; Polly, 2014.
Empirical with quantitative techniques [21]	Cabero, Roig-Vila & Mengual-Andrés, 2017; Makenney & Voogt, 2017; Nasution, Sriyati, Riandi & Safitri, 2017; Tarraga-Mínguez, Sanz-Cervera, Pastor-Cerezuela, Fernández-Andrés, 2017; Yerdelen-Damar, Boz & Aydin-Gunbatar, 2017; Zhang, Liu & Wang, 2017; Almérich, Orellana, Suárez, Díaz García, 2016; Cabero & Barroso, 2016. García Valcárcel & del Pozo, 2016; Holland & Piper, 2016; Handal, Campbell, Cavanagh & Petocz, 2016; Muñoz & Repiso, 2016; Roig-Vila, Mengual-Andrés & Quinto-Medrano, 2015; Çalik, Özsevgec, Ebenezer, Artun & Küçük, 2014; Celik, Sahin, Akturk, Kopcha & Ottenbreitl, 2014; Coklar, 2014; Holland & Piper, 2014; Koh, Chai y Tay, 2014; Lye, Wee, Kwek, Abas & Tay, 2014; Messina & Tabone, 2014; Yurdakul & Coklar, 2014.
Empirical with mixed techniques [4]	Getenet, Beswick & Callingham, 2016; Yelken, Konokman & Tokmak, 2015; Wu & Wang, 2015; Mouza, Karchmer-Klein, Nandakumar, Ozden & Hu, 2014.

Main conclusions

The last criterion allows us to evaluate the contributions of each of the selected investigations. The convergence between ICT and TPACK is positive in a 58.14% of the texts analyzed. Specifically, 34.89% of them reveal the importance of the acquisition of skills within the framework of the TPACK, the achievement of objectives, the development of practical objectives, task execution and problem solving. A 23.5% of the texts point to technological competence and specifically to digital competence, while a 16.27% emphasize the improvement of learning outcomes in the context of TPACK. Other studies consider the TPACK model as a diagnostic reference in professional development (20.93%), discovering few studies based on the obstacles posed by the use of technology in the educational context.

Table 4. Distribution of publications according to the main conclusions

Conclusions	Publications
TPACK skills [15]	Avidov-Ungar & Shamir-Inbal, 2017; Gill & Dalgarno, 2017; Makenney & Voogt, 2017; Munyengabe, Zhao, He & Hitimana, 2017; Nasution, Sriyati, Riandi & Safitri, 2017; García Valcárcel & del Pozo, 2016; Muñoz & Repiso, 2016; Okumuş, Lewis, Wiebe & Hollebrands, 2016; Gómez Chova, López & Candel, 2015; Çalik, Özsevgeç, Ebenezer, Artun & Küçük, 2014; Celik, Sahin, Akturk, Kopcha & Ottenbreitl, 2014; Holland & Piper, 2014; Kopcha, Ottenbreit-Leftwich, Jung & Baser, 2014; Lee & Kim, 2014; Yurdakul & Coklar, 2014.
Technological competence-digital competence [10]	Spiteri & Rundgren, 2017; Tarraga-Mínguez, Sanz-Cervera, Pastor-Cerezuela, Fernández-Andrés, 2017; Yerdelen-Damar, Boz & Aydin-Gunbatar, 2017; Zhang, Liu & Wang, 2017; Getenet, Beswick & Callingham, 2016; Orellana, Suárez & Díaz García, 2016; Coklar, 2014; Messina & Tabone, 2014.
Learning outcomes [7]	Jones, Schupbach, Harvey, Bulger & Voelker, 2017; Koh, Chai & Ling, 2017; Chova, Martínez & Torres, 2016; Handal, Campbell, Cavanagh & Petocz, 2016; Meletiou-Mavrotheris & Prodomou, 2016; Wong, Chai, Zhang & King, 2015; Mouza, Karchmer-Klein, Nandakumar, Ozden & Hu, 2014.
Teaching professional development [9]	Cabero, Roig-Vila & Mengual-Andrés, 2017; Cabero & Barroso, 2016; Holland & Piper, 2016; Szeto, Ching, Hong, 2016; Kontkanen, Dillom, Karkkainen, Kukkonen, Valtonen & Vaisanen, 2015; Roig-Vila, Mengual-Andrés & Quinto-Medrano, 2015; Yelken, Konokman & Tokmak, 2015; Koh, Chai y Tay, 2014; Lefebvre, 2014. Polly, 2014.
Obstacles [2]	Hansen, Mavrikis & Geraniou, 2016; Lye, Wee, Kwek, Abas & Tay, 2014.

Discussion And Conclusions

It has been observed in most of the investigations that the TPACK model can favor technological skills together with pedagogical and disciplinary content. We have also found that personal and contextual factors have a relevant impact on the subsets of the analyzed competences. In addition, it is considered how the current university study programs of Primary Education are providing future teachers with a sufficient level of professional skills (based on the TPACK model), considering the need to improve a wide range of specific subjects on digital technologies applied to education.

The TPACK model from the perspective of teachers favors technological competence-digital competence, finding outcomes of self-perception of teachers much higher in technological competence in the use of ICT in some of the studies. It was found that some studies helped to clarify and delimit the framework for teachers' ICT skills.

Investigations show that in the initial training of teachers, technological knowledge is not excessively focused in reference to learning outcomes, as some authors suggest, finding better outcomes in pedagogical training in Spanish universities.

Regarding the teaching professional development, studies raise the need for teachers to bring into play the three types of knowledge: pedagogy, content and technology. The need to plan activities in an integrated manner is highlighted (Castillejos-López, Torres-Gastelú & Lagunes-Domínguez, 2014).

As limitations, we have found the lack of longitudinal empirical studies; the target audience consists mostly of students of higher education and primary education, with few studies of secondary education and general education for all audiences.

References

Cabero, J. & Barroso, J. (2016). ICT teacher training: a view of the TPACK model / Formación del profesorado en TIC: una visión del modelo TPACK, *Cultura y educación*, 28:3, 633-663, DOI: [10.1080/11356405.2016.1203526](https://doi.org/10.1080/11356405.2016.1203526)

Cabero, J. (Dir.) (2014). *La formación del profesorado en TIC: Modelo TPACK. Conocimiento Tecnológico Pedagógico y de Contenido*. Retrieved from

- https://www.academia.edu/8021740/La_formaci%C3%B3n_dle_profesorado_en_TIC_Modelo_TPAC_K_Conocimiento_tecnol%C3%B3gico_pedag%C3%B3gico_y_de_contenido
- Castillejos-López, Torres-Gastelú & Lagunes-Domínguez (2014). El enfoque del Conocimiento Tecnológico Pedagógico del Contenido (TPACK): Revisión del modelo. In Esquivel Gámez, I. (Coord.) Los Modelos Tecno-Educativos, revolucionando el aprendizaje del siglo XXI (pp. 237-252). Mexico. Retrieved from <https://goo.gl/G8nTdk>
- Mishra, P., & Koehler, M. J. (2006). Technological Pedagogical Content Knowledge: A new framework for teacher knowledge. *Teachers College Record*, 108(6), 1017-1054. Retrieved from http://punya.educ.msu.edu/publications/journal_articles/mishrakoehler-tcr2006.pdf
- Sampieri, R., Collado, C., & Lucio, P. (2014). Metodología de la investigación. Nueva York: Ed. McGraw-Hill.
- Shulman, L. S. (1986). Those who understand: Knowledge growth in teaching. *Educational Researcher*, 15(2), 4-14.
- Shulman, L. S. (1987). Knowledge and Teaching: Foundations of the New Reform. *Harvard Educational Review*, 57 (1), 1-2. Trans. Spanish. In: Shulman, L.S. (2005). Conocimiento y Enseñanza: fundamentos de una nueva reforma. *Profesorado. Revista de currículum y formación del profesorado*, 9, 2. Retrieved from <http://www.ugr.es/local/recfpro/Rev92ART1.pdf>
- Torres-Toukourmidis, Romero-Rodríguez & Pérez-Rodríguez (2018). Ludificación y sus posibilidades en el entorno de blended learning: revisión documental, *RIED. Revista Iberoamericana de Educación a Distancia*, 21(1), pp. 95-111. DOI: <http://dx.doi.org/10.5944/ried.21.1.18792>
- Wollscheid, S., Sjaastad, J., & Tømte, C. (2016). The impact of digital devices vs. Pen (cil) and paper on primary school students' writing skills—A research review. *Computers & Education*, 95, 19-35. DOI: <https://doi.org/10.1016/j.compedu.2015.12.001>

The Use Of Internet Content With Interest In Learning English On High Schools Students

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Abstract

The official language in Indonesia is Bahasa. English is one of the foreign languages taught since junior high school and it is mandatory to learn. However, the motivation to learn English among students is still relatively low. This has result in low ability of English speaking students. On the other hand the Internet is very popular among students and has a lot of English-speaking content. This study aims to determine: 1) the intensity of students in using internet content in English; and 2) the relationship of the intensity of the use of air-English Internet content with interest in learning English. This research uses survey method to high school students in Jakarta. The results of the data are known that: 1) the intensity of internet usage of English content in High School Students is low, and 2) there is a significant relationship between the intensity of English internet content usage with the interest of learning English. Therefore, to increase students' interest in learning English, it is recommended that students frequently access English Internet content.

Keywords: *Internet, English Internet content, Interest in learning English*

Preliminary

The international language used by various nationalities is English. Indonesia officially starts teaching English from junior high school. There are also some schools, especially those who managed by the private sector, have learned English starting from elementary school. The Indonesian government has determined that learning English is mandatory for student's starts in junior high school level. English lessons have also been established as one of the subjects tested in the National Exam (UN). It shows the great attention of the Indonesian government to its citizens to be able to master English as an International language.

The government is very serious in English Lesson however this has not directly influences to the quality of learning English in schools. Student's ability in English language is still low, this is also a result from low quality methods of learning English in schools and university level. For instance English learning process in one of the private universities in the suburbs East Java province performed by Maghfiroh (2016). The results of the study indicates constraints that happened in learning foreign language in the program of education English language: 1) Indonesian language is still dominant in the learning process; 2) Low motivation to learn and master English language, and also feel ashamed and scared if they will make mistakes while speaking English; 3) Supportive environment for student to speak foreign language among college student was not created; 4) Less time to practice the skills learned in speaking English.

At the junior secondary level, the results of research conducted by Ariastuti, et al (2014) in junior high schools in Makassar, South Sulawesi have indicates problems in learning English: (1) explaining the textbook with guidance from textbook without variations; (2) the instructional media used is not attractive, rarely practice such as listening, speaking, reading, and writing. Students are prepared with material that was used to answer the exam questions, smart students is defined only students who has good test scores.

The low quality of learning is exacerbated by the low interest of students to learn English. Interest is the tendency of an inactive subject, it is very important to feel interested in a particular subject and being happy to learn the material (Winkel, 2004). According to Hilgard (Slameto, 1995) explains that interest is the tendency to recall and remember some of the activities that a person is interested, constantly paying attention accompanied by

stimulus.

Interest means an individual's attracted feeling or happy to learn, in this case learning English. If the facilities and learning environment is less supportive, but have a strong interest in learning English, then the learning results will be better. This is in accordance with holistic theories of learning, emphasizing that the behavior is *purposive*, which means that the intrinsic aspect (intention, determination, will) of the individual is the important determinants for the birth of certain behaviors even in the absence of stimulation (*stimulus*) coming from the environment (naturalistic). This means according to the holistic school that the determinants of learning success are intrinsic factors of students concerned, one of which is interest in learning (Anwas, 2009).

Interest is very important in improving learning achievement. The Liang Gie (1995) confirms the importance of interest in learning, gaining attention, facilitate the creation of concentration, prevent interference from outside, strengthen the memory/learning comprehension, and minimize boredom to learn. Therefore, to improve the ability of English, students' interest in English lesson needs to be improved.

Efforts to increase interest in learning English can be done by using information and communication technology (ICT). Research on the utilization of ICT can facilitate student learning ((Anwas, 2015), (Gray, et al, 2007), (Ghadirian and Job, 2017), Mikal et al (2014), Aberg et al (2016), (Wang, 2018)). The results of the study done by Aberg et al (2016) shows that using digital learning resources can improve writing ability in participants. Sabar and Rahman (2011) conducted research on the Head Office of Briton International English School Makassar, Indonesia. The study aims in knowing the role and function of multimedia center and value added obtained by the students from using the Web (e-Learning) through multimedia center at Briton International English school Makassar. The results of this study indicate that the use of Web (e-Learning) has made, the students earn various kind of value added (benefits), such as: a) attain many information and materials learning, with ease, fast and more detailed; b) could access information inform of text, images, and occasionally interesting video; and c) students could develop skills especially reading, writing, vocabulary, and grammar.

The Internet has a lot of content that uses English. The content contained on the Internet varies greatly in text, image, audio, video, simulation and animation formats. The content is designed specifically for learning and some are not specifically designed but can be utilized for learning (by utilization). All English-language content can be optimized to improve English learning ability and achievement. The problem is the frequency of students using English, and whether there is a relationship between the frequencies of the use of English content with the interest of learning English. This study aims to determine: 1) the frequencies of students in using Internet content in English; and 2) the relation of the frequencies of using English internet content with the interest of learning English.

Research Methods

This research uses survey method towards high school students in Jakarta. The population is high school students in Jakarta. Samples taken using random sampling techniques, in number of 185 people. Data collection was conducted in March 2018.

The data is collected through questionnaire about the frequencies of the students in using English Internet content and the interest of learning English. Student frequencies indicators using English Internet content are measured by how often the students use English Internet content. Interest indicator is measured by the feeling of the student's likes or dislikes on English lessons. This means that students who have a positive feeling to learn English means that they have a good interest in English lessons. On the other hand, if students dislike learning English they will be categorized with no interest in learning English.

The collected data was analyzed using descriptive statistics and statistics Spearman's correlation. To facilitate data processing used SPSS application version 23. Through analysis of data is expected to be able to answer the research question.

Results And Discussion

In accordance with the purpose of research, the variables studied in this study is two that is 1) the frequencies of students in using English-language internet content; and 2) the relation of the frequencies in the use of English internet content with the interest of learning English. The result of data is using descriptive statistics, obtained data is shown in **Table 1**.

Table 1. Intensity of Accessing English Internet Content

No		f	%
1	Never	5	2.7
2	Rarely	112	60.5
3	Often	54	29.2
4	Always	14	7.6

Table 1 explains that the majority of students 60.5% are rarely access English Internet content, and even 2.7% claim never. Only a small part of the 29.2% who claims often and only 7.6% who claim always accessing English Internet content. The data pointed that the students use English Internet content is still low. However the results of previous research conducted by (Chalim and Anwas, 2018) that in general the frequencies of internet usage by students in the city of Jakarta is quite high, the average of more than two hours per day. This means the potential of students to take advantage from English language Internet content is great.

The use of Internet is closely related to the availability of Internet infrastructure. The location of this research in the city of Jakarta in general the Internet infrastructure is better when compared with rural areas and other cities. The question is how the English internet content are use in other cities and villages where the availability of Internet infrastructure is lower than Jakarta. More research needs to be done, how frequent the use of English Internet content utilization in other area outside Jakarta.

Interest in learning English, the result of descriptive statistical processing described in **Table 2** as follows.

Table 2.Interest in Learning English

No		f	%
1	No interest	3	1.6
2	Less interested	104	56.2
3	Interested	67	36.2
4	Very interest	11	5.9

Table 2 shows that more than half (56.2%) of students stated less interest in learning English, and there were 1.6% of students who expressed no interest. 36.2% of students who expressed interest and 5.9% who expressed great interest. The data explains that most students are less interested in learning English, and only a small proportion indicates interest in learning English. This research was conducted in the capital city of Indonesia that shows low English proficiency, it can be generalize also in the city level in Indonesia. How students who live in the village in the remote areas can learn English is another interesting issue that need to do further research.

This interest factor is very important to improve learning achievement. This is explained in the studies conducted by The Liang Gie (1995), Maghfiroh (2016), research conducted Ariastuti, et al (2014), and Malek, et al (2011). Therefore, the low English proficiency among students is caused by the low interest of the students towards the English lesson.

Spearman correlation test results are presented in **Table 3** below.

Table 3. Correlation of Interest in Learning English

	r	sig
Frequencies Accessing English Content	0.263	0,000 **

Table 3 shows that from the correlation test results the correlation value is 0.263 with 0.000 significance values. It means that the students' ability to access English Internet content is positively related and significant with their interest in learning English, at 99 percent confidence level. It can be interpreted that if students' frequencies in accessing Internet content in English is high, then students' interest in English lessons is also high. In reverse, if the students' intensity in accessing English Internet content is low, the student's interest in English lesson is also low.

In **Table 1**, in general the intensity of students in accessing Internet content in English is low. Similarly, in **Table 2**, in general the students' interest in learning English is also low. It can be interpreted that to increase students' interest in learning English, we can achieve it through increasing student's frequencies in accessing English Internet content.

Previous research conducted by Chalim and Anwas (2018) in Jakarta states that the level of Internet usage among

students is quite high. It means there are potential for student's to change on how they use the Internet into accessing English Internet content. Internet contents that being accessed often by students are mostly from social media that presented in Bahasa (Chalim and Anwas, 2018). It is also recognized that in Indonesia the use of the Internet is dominantly for leisure purpose and communication activities. Results of a study conducted by Tech in Asia (2015) shows that majority of Internet users in Indonesia search for news and entertainment, but the percentage of users that accessing educational content is only 5% of total. Likewise, the television programs favored by the majority of viewer's are entertainment and information (Kusuma and Hardiyanto, 2015). This potential can be diverted to not only communicate or search for content in Bahasa, but also content in English language. The students' ability to access Internet content, especially in English has the potential to be upgraded, so interest in English lessons can be improved as well. This can be attributed to the advantages of the Internet that is able to present the content in a varied form. The Internet is able to present text-based content, images/photos, audio, video, animation, and simulation. Text based Internet contents can be: news, information, articles, books, short stories, novels, and other forms. Audio contents can be: song or poetry, dialogue or monologue or dramatization. The results of research done by Ariastuti, et. al. (2014) shows that many students interested in learning a language by using audio-visual media. Qualitatively, atmosphere in learning English language will be more fun and create positive effects to students' development.

Video and animation Internet content could be in the form of movies, songs, or games. Simulation content could be in a form of demonstration or practice related to the language skills such as reading, writing, listening, and speaking. The results of the study done by Laren (2012) shows that utilization of technology in learning, especially using audio-visual media, makes the students feel happy to read poetry by using pronunciation, stressing, intonation, and pausing method. The diversity of this content becomes an alternative choice for students who match and in accordance with the habits or learning conditions.

Internet media also has the advantage, that is able to communicate interactively. Research done by John et.al (2016) asserted that learning *online*

could improve interaction and engagement of participants (student-centered learning). This communication can be done directly (synchronous) or indirectly (asynchronous). Students can practice their ability in communicating English with their friends, teachers, parents, or anyone else, through, for example: email, video call, or through social media (facebook, whatsapp, twitter, instagram, etc.).

Using Internet in learning is flexible. As long as there is availability of devices and networks, students can use the Internet wherever and whenever there is a chance. The Internet is capable and easily accessed through various devices, such as: laptop, PC, mobile phones, smartphones, tablets, and other various devices. This shows that there is great opportunity and chance for students to utilize English Internet content in improving the students' interest and achievement in learning English.

How to make students who are frequently accessing the Internet for regular purpose to be diverted to utilize English Internet content? The results of Chalim and Anwas (2018) study confirmed that to familiarize students accessing Internet content that supports learning is the involvement of parents and teachers. The result of this study proves there is a positive and significant relationship between the role of parents and teachers with the use of the Internet for learning purposes.

The results of Chalim and Anwas research can be synthesized with the results of this study that to familiarize students access English internet content, the role of parents and teachers is very important. Parents need to guide and direct their children to access positive Internet contents. In this case, the content is relevant to increase the interest and achievement of learning English. Teachers need to provide guidance including learning tasks so that students are encouraged to utilize content in English in order to increase their interest and learning achievement of English subjects. Through this practice, students are expected to be train in English as a foreign language, both in reading, writing, listening and speaking.

Conclusion

The frequencies of high school students in accessing English Internet content are low. Similarly, students' interest in English lessons is also low. The low usage of English Internet content has a positive and significant relationship with the low interest in learning English. If the students frequencies in accessing English Internet content are high, then students interests in English lessons are also high. Then, if the students' frequencies in accessing English Internet content are low, the student's interests in English lesson are also low. Therefore, to increase students' interest in learning English, it is recommended for students frequently access English Internet content. English Internet content could be presented in many kinds of form: text, images, audio, video, animation, and simulation, it is very popular for students. Therefore, the Internet can be utilized interactively and communicatively to practice English proficiency globally, including the native speakers.

Bibliography

- Aberg, ES, Stahle, Y., Engdahl, I, Nyqvist, HK. (2016). *Designing a Website to Support Students Academic Writing Process*. TOJET: The Turkish Online Journal of Educational Technology, 15 (1), p. 33-42.
- Anwas, E. O. M. (2009). *Utilization of Media in Developing Agricultural Instructor Competence (Cases in Karawang and Garut District, West Java Province)*. Bogor IPB Dissertation. <http://repository.ipb.ac.id/handle/123456789/22439>
- Anwas, O. M. (2015). *Utilization of ICT at Pesantren Rakyat Malang East Java*. Journal of Education and Culture (National Accredited), Vol. 21 No. 3, December 2015, Balitbang Dikbud. DOI:[10.24832 / jpnk.v21i3.187](https://doi.org/10.24832/jpnk.v21i3.187)
- Ariastuti, Anik; Wahyuddin, HM; and Maryadi. (2014). *Increasing Interest of Student in Learning English Through Audio-Visual Media at SMP Negeri 1 Klaten*. Journal of Linguistics and Literature Studies, Vol. 26, No. 1, June 2014, p. 32-41.
- Chalim, S. and Anwas, O. M. (2018). *The Role of Parents and Teachers in Building the Internet as a Learning Source*. Journal of Counseling, Postgraduate IPB. March 2018 Vol. 14 No. 1. Page 42 -52. <http://jurnal.ipb.ac.id/index.php/jupe/article/view/19558>
- Ghadirian, H. and Job, FMJ. (2017). *Peer Moderation of Asynchronous Online Discussions: an Exploratory Study of Peer e-Moderating Behavior*. Australasian Journal of Education Technology Vol 33 No. 1 2017. <https://ajet.org.au/index.php/AJET/article/view/2882>.
- Gray, C., Pilkington, R., Hagger-Vaughan, L., and Tomkins, S. A. (2007). *Integrating ICT into classroom practice in modern foreign language teaching in England: making room for teachers' voices*. European Journal of Teacher Education, 30(4), P. 407-429.
- John, B., Thavavel, V., Jayaraj, J., Muthukumar, A., Jeevanandam, PK. (2016). *Design of Open Content Social Learning that Increases Learning Efficiency and Engagement Based on Open Pedagogy*. TOJET: The Turkish Online Journal of Educational Technology, 15 (1), p. 20-32.
- Kusuma, N. and Hadiyanto. (2015). *Watching Behavior and Farmer Satisfaction of the Knitting Program on TV Trans 7 TV*. Journal of Information, March 2015 Vol 11 No. 1. P. 60 - 68.
- Larlen. (2012). *Efforts to Increase Interest Learn Bahasa Indonesia Through Utilization Technology In Classroom Learning XS MA Pelita Raya Jambi*. Pen Journal. Vol. 2 No. July 2, 2012. FKIP University of Jambi. p. 49-70.
- Malek, T. J., Noor-Azniza, I., and Farid, T. M. (2011). Emotional intelligence in modifying social and academic adjustment among first year university students in North Jordan. International Journal of Psychological Studies, 3(2), 135
- Maghfiroh, A. (2016). *Problem in Foreign Language Character Establishment Among Students of English Education Study Program*. Journal Dimensions of Education and Learning. <http://eprints.umpo.ac.id/1771/>
- Mikal, J. P., Yang, J., and Lewis, A. (2014). Surfing USA: How Internet use prior to and during study abroad affects Chinese students' stress, integration, and cultural learning while in the United States. Journal of Studies in International Education, 1028315314536990.
- Sabar, K., and Rahman, A. (2011). *Using Web (E-Learning) in Learning English in Briton International English School Makassar*. Journal Communication KAREBA Vol. 1, October 4 - December 2011.
- Wang, Q.; Huang, C.; and Quek, CL. (2018). *Students' Perspectives the Design and Implementation of a Blended Synchronous Learning Environment*. Australasian Journal of Education Technology Vol. 34 No. 1 of 2018. <https://ajet.org.au/index.php/AJET/article/view/3404>
- Slameto. (1995). *Learning and Factors That Affects It*. Rineka Cipta: Jakarta
- Tech in Asia. (2015). *Statistics of Internet Users and Social Media in Indonesia*. <https://id.techinasia.com/talk/statistik-pengguna-internet-dan-media-sosial-di-indonesia>.
- The Liang Gie. (1995). *Effective Learning Method*. Yogyakarta: Liberti.
- Winkel. (2004). *Educational Psychology*. PT. Grasindo.

3D Software Environment For Educational Sprego Programming

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Abstract

The traditional methods for teaching spreadsheets are rather inefficient as they focus on the specific technical features of spreadsheet software. The main drawback of this approach is that students and end-users have to memorize an extensive amount of functions together with their arguments. Moreover, these functions can vary from interface to interface, or even become obsolete, be changed or be renamed in different versions of the same family of applications. With the technical details in the center, the focus is rather on the syntax and tools instead of developing the students' algorithmic and computational thinking skills and their ability to think abstractly.

By contrast, Sprego – Spreadsheet Lego – programming offers a scientifically proven, more effective alternative, because it establishes a concept-based problem-solving approach with real-world problems in focus, computational thinking, algorithmic and computer problem-solving skills and schema-construction to develop the students' capability to make reliable decisions at speed, yet it avoids the common pitfalls mentioned above.

Previous research and developments have introduced semi-unplugged tools for the visual representation of Sprego-implemented algorithms. Among them, a piece of software was implemented in a 2D environment which uses animations based on real-life examples to aid the students' learning process of the method. The application supports a searching algorithm and a counting algorithm, which are both fundamental parts of understanding Sprego programming principles. The research group has conducted experiments on applying this piece of software in education and the results were positive and promising, which clearly indicated that the visualizations of these algorithms are helpful for the students.

In our current work, we are presenting a new semi-unplugged application which transforms the functionality of the previously mentioned piece of software into a new 3D environment. Our aim is to increase the students' enthusiasm by creating a more engaging, modern and visually attractive representation of Sprego algorithms and formulae. The software is being implemented in Unity3D not just because it makes our project highly customizable, but it also provides support for a wide range of platforms including Windows, iOS, Macintosh, Linux and Android. This multi-platform availability will make it easy to use this application with distinct ICT devices such as smartphones, tablets and interactive whiteboards. In the subsequent phases of our research, we would like to improve our software by implementing new features and algorithms. After developing the application, we are planning to measure its effectiveness in classrooms in the near future.

Introduction

Sprego

The primary focus of our research is to develop a 3D visualization environment for Sprego-implemented algorithms. In this section we introduce Sprego methodology before discussing the details of our 3D software and the motivations for creating it.

Sprego is a relatively new method (Csernoch, 2014) which provides an alternative approach for spreadsheet-related real world problem-solving. The name Sprego itself is a portmanteau word which stands for **S**preadsheet **L**ego. In order to understand the core principles behind Sprego, we must start with examining the pitfalls and difficulties of the traditional method.

The first pitfall derives from the software itself because there are compatibility issues between the different versions. For example, spreadsheet functions can be renamed in newer releases as seen in Figure 1.

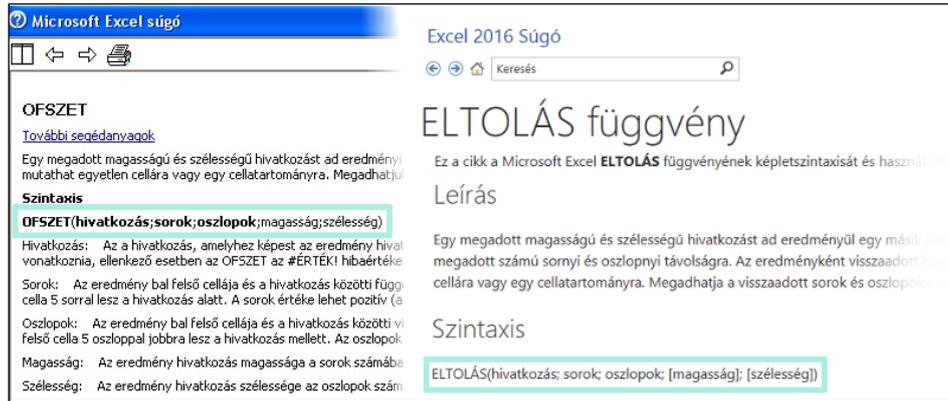


Figure 1. Name and syntax of the OFFSET() function in the Hungarian translation of Microsoft Excel 2003 (left) and 2016 version (right).

The second pitfall comes from an inconsistency between the order of the arguments of functions that are really similar in nature. As an example, SUMIF() takes its arguments in a completely different order compared to SUMIFS() which increases the risk of constructing semantically incorrect formulae (Sebestyén & Csapó, 2018). Another difficulty is related to the extensive amount of problem-specific functions. Memorizing these functions with their specific purposes and arguments is an overwhelming task, not just for students, but even for more experienced users. For instance, looking up a specific value from a vector or a matrix i.e. executing a linear search is a common problem in Spreadsheet environments. The user could theoretically solve the problem by using either LOOKUP(), HLOOKUP(), VLOOKUP(), or the INDEX(MATCH()) composite function (Microsoft 2018). However, the first 3 functions have their own limitations which makes them more problem-specific compared to using the INDEX(MATCH()) composite function (Table 1).

Table 1: Comparison of LOOKUP(), HLOOKUP(), VLOOKUP() and INDEX(MATCH()).

Function (or composite function)	Search vector	Sorting order of the search vector
LOOKUP()	both rows and columns	ascending
HLOOKUP()	only rows	ascending / unordered
VLOOKUP()	only columns	ascending / unordered
INDEX(MATCH())	both rows and columns	ascending / unordered / ascending

Teaching too many functions is not just unnecessary, but it is also inefficient as an average user only uses about 12 functions on a regular basis (Walkenbach, 2010). Furthermore, as we mentioned above, any of these functions can become obsolete or be changed in other spreadsheet software versions. Additionally, the most efficient way to develop students' programming skills in an environment like LOGO or Sprego is to gradually build up a set of instructions (in this case, functions) from 5 to a maximum limit of 15 (Freiermuth et al., 2008).

By contrast to the pitfalls of traditional spreadsheet education, Sprego offers an alternative which eliminates all the difficulties mentioned above. The core principle of this method is to use only 12 fundamental, general-purpose spreadsheet functions (Table 2).

Table 2: The 12 fundamental Sprego functions.

Text	Math	Miscellaneous advanced
LEFT()	MIN()	IF()
RIGHT()	MAX()	MATCH()
SEARCH()	SUM()	INDEX()
LEN()	AVERAGE()	ISERROR()

Focusing on functions that can be found in all interfaces ensures the compatibility of all variations of spreadsheet software and versions because these functions have been consistent in their names and arguments since their first appearances. Additionally, these 12 functions are unambiguous because they are properly named, and the names clearly indicate the one specific task that they carry out. In addition to this, a Sprego user needs to develop a

thorough understanding of these 12 functions only, which is less difficult compared to the countless amounts of problem-specific functions of the traditional spreadsheet workflow (Csernoch et al., 2014). In addition, a crucial feature of the Sprego method is the usage of composite functions and array formulae. The main advantage of using composite functions is that it develops the students' algorithmic and computational thinking skills and it provides examples and applications for widening their mathematical knowledge in the subjects of functions and arrays (Csernoch, 2014 and 2017). Another benefit of using Sprego is that it opens up new opportunities for using unplugged teaching methods in the classrooms (Bell & Newton, 2013; Csernoch & Biró 2017). For example, Matryoshka dolls can be used to demonstrate how composite functions work and how they relate to functions in traditional text-based programming languages (Figure 2).



Figure 2. Unplugged teaching methods – Matryoshka dolls.

2D visualization of Sprego algorithms

Our software is based on a previous research project in which the researchers have developed a 2D visualization application for different Sprego-implemented algorithms (Figure 3). The application consists of two animations for two different scenarios, one visualizing conditional counting with a $\{=SUM(IF())\}$ array formula, and the other one simulating the execution of linear search with an $=INDEX(MATCH())$ composite function. The purpose of these animations is to provide a better understanding of the algorithms behind these Sprego solutions to show the executed actions step-by-step. The software features real-life based examples, coloured Matryoshka dolls (as avatars) and multi-platform availability to support Android, Windows, Mac and Linux (Csapó & Sebestyén, 2017; Csapó, 2017; Csapó & Sebestyén, 2018).



Figure 3. 2D Sprego visualization application.

MOTIVATION

The main goal of this piece of research is to transform the existing 2D visualizations into a 3D environment. More specifically, this transformation can be divided into two major areas:

- the first involves creating the 3D models, textures and UI elements for the new environment and
- the second is the programming aspect.

Our hypothesis is that if we implement a highly interactive, more appealing and videogame-like software into Sprego for students, they will show more interest towards Sprego in general, and it will result in increased efficiency regarding the understanding of the algorithms behind problems in Sprego.

We aimed to keep the core aspects of the 2D visualizations, i.e. the Matryoshka dolls, the authentic real-life examples and the multi-platform availability while implementing new features using the advantages provided by

the 3D environment (Figure 4). Interactivity is our further concern because we want to create a software that can be used efficiently in education that grasps the students' attention and facilitates their learning processes instead of making them passive observers.

Our distant goal is to create an application which serves a unique purpose in education, as it could be used to establish a bridge between the unplugged (for example, using Matryoshka dolls to demonstrate how composite functions work) and plugged-in methods (like solving spreadsheet problems in front of a computer).



Figure 4. Comparison between the 2D (left) and the 3D (right) environment.

RESULTS

Modelling

The modelling and art-related tasks of the creation process were carried out using Blender for most of the 3D models (Blender 2018), MagicaVoxel for the detached house models (MagicaVoxel, 2018) and GIMP for 2D textures and UI elements (GIMP, 2018). We decided to use these applications not just because they are freeware, but they are also popular and well-documented as well, which made it simpler to learn how to use them. The first step of the 3D modelling process was to establish an abstract environmental model. This specifically meant that we had to split the already given 2D environment into atomic elements. The abstraction provided an explicit list of 3D models we had to create one by one. This list was an efficient way to specify modelling tasks and to plan our workflow in advance (Table 3).

Table 3: Result of the abstraction process, a total of 38 3D models in the conditional counting (Forest) and the linear search (City) tasks.

Model	Scene	Number of variations
Tree	Forest	10
Bush	Forest	5
Campfire	Forest	1
Matryoshka Doll	Forest, City	10 (different textures)
House	City	9
Street lamp	City	2
Town sign	City	1

We have decided to aim for a low poly art style in our application for multiple reasons. First of all, performance is a crucial priority in educational software. When making a 3D application designed to use in schools, it is important to consider the possible hardware limitations. In addition to this, as we stated in subsection Motivation we want to target mobile platforms as well (primarily Android). Low poly art style is undoubtedly performant as it uses 3D models that only consist of a few polygons. Less polygons means less calculations for the graphics card which equals to better performance and lower system requirements for the application itself. Our second concern

was the students' perception of the visuals. The primary focus was to create the feelings of being in a video game and playfulness simultaneously in order to make the Sprego learning process more efficient. After considering a handful of options, we have decided to choose the low poly art style as it satisfied our criteria with its cartoon-like look and great performance (Figure 5).

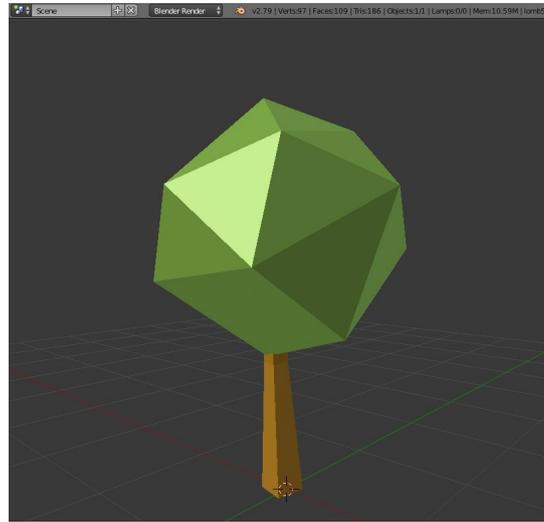


Figure 5. A low poly tree model in Blender.

Modelling the Matryoshka dolls required a different workflow and technical approach as we had to apply textures to them. The first step was to create a doll geometry which is appropriate to act as an avatar in the application, yet looks similar to the real-world dolls. After that, the next task was to unwrap the geometry of the dolls and to draw all the different textures in GIMP. The bright and detailed textures ensured that the avatars stand out from the low poly environment, thus making the application more user-friendly. Finally, we used UV mapping to map each different texture to each doll geometry one by one (Figure 6).

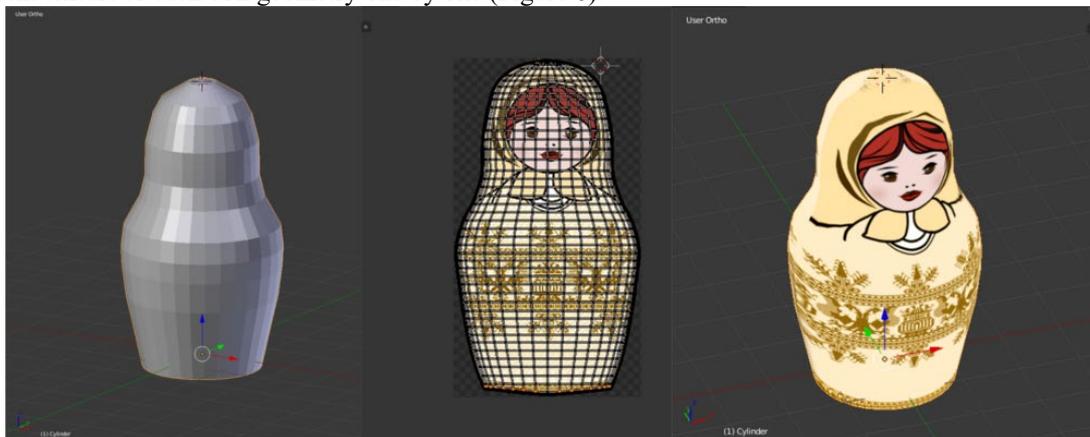


Figure 6. Applying the texture to the geometry via UV mapping.

Programming

Our software of choice was the Unity3D game engine (Unity Technologies, 2018) for the implementation process. Unity is a game engine which can be used to develop 2D and 3D applications via C# scripts and built-in tools. It is completely free for non-profit usage, and it is generally well-documented (Unity Documentation, 2018). Additionally, it is immensely popular and has a large, helpful and active developer community (Unity Forums, 2018). Furthermore, Unity is a feature-packed game engine, which made prototyping much easier compared to other available options. In addition to this, the easy learning curve and highly customizable behaviour provided the optimal workflow for our project.

Initially, we had to import all 3D models to build the environment from scratch using the Unity Editor. During this process we tweaked many settings to fit our visualization goals, including the lighting and shadows of the scenes (Figure 7). The prefab system of Unity made it possible to define reusable objects of the environment such as the dolls themselves. The primary advantage of using prefabs is that if you make any changes to the prefab, these changes are immediately reflected in all existing instances of this prefab.

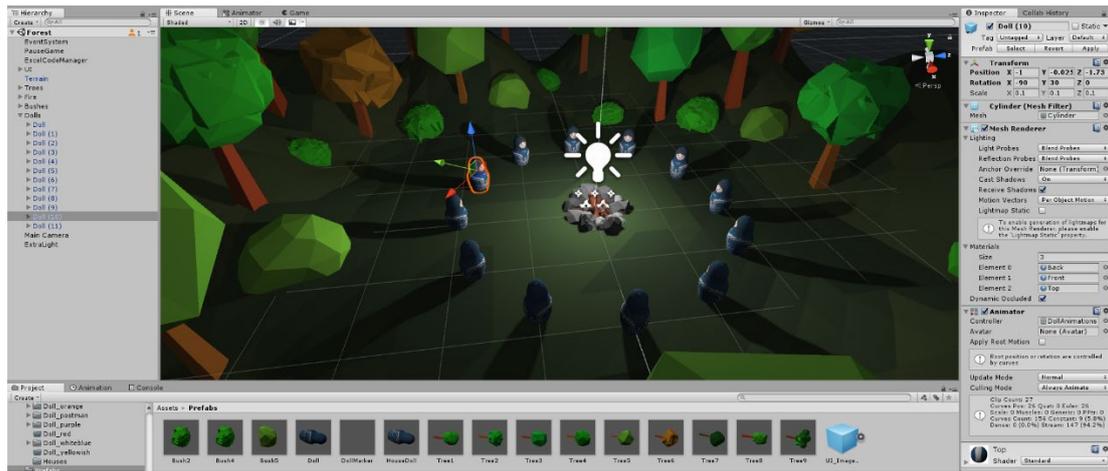


Figure 7. Creating the forest scene in Unity3D.

The animation of the conditional counting algorithm works similarly to the one present in the 2D application (Csapó & Sebestyén, 2017). However, the animating process was rather different due to the differences between the nature and purpose of Construct and Unity3D. In Unity, we relied on two provided tools:

- Animation Assets and
- Unity Animator.

Animation assets are used to create frame by frame animations for any object that resides in the current project. Our task was to create a different animation for each position that the dolls can walk into, which adds up to a total of 24 animations. After that, we used C# scripts and the Animator component to control how the animation behaves. The Unity Animator is similar to a finite state machine in the following respects:

- the states reflect the current status of the animated object (a state usually equals to an animation)
- there are special states (for instance, entry point of the animation)
- transitions can be defined to change the state of the animator

With this in mind, we designed a finite state machine that gave us full control over the animation (Figure 8). This proved to be very convenient later on, as with the control that the animator provided we were able to implement useful features such as a slider that controls the speed of the animation in runtime.

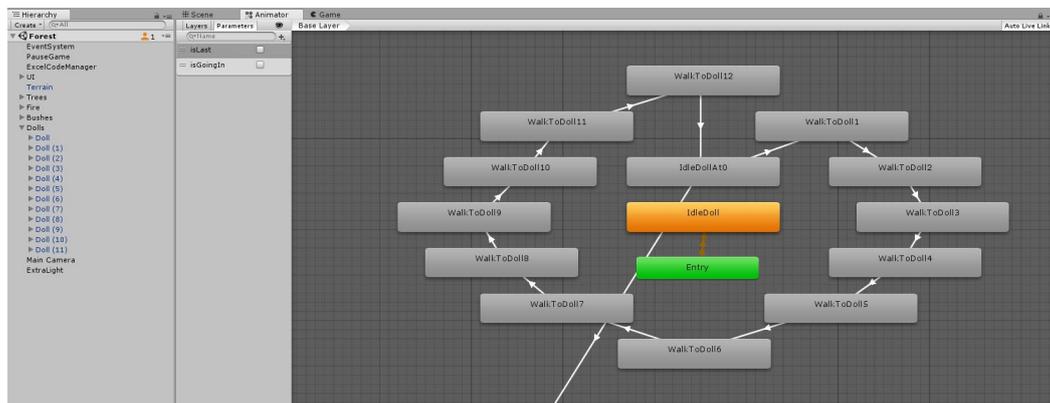


Figure 8. Part of the finite state machine that controls the forest scene.

After animating the dolls, our main focus was to assemble a user-friendly UI that can communicate easily with the animation-related components. Unity3D comes with a flexible UI system which includes many out-of-the-box UI elements such as buttons, sliders, panels and input fields. We drew fitting 2D graphics using GIMP to make the whole application visually appealing (Figure 9). Furthermore, we implemented a light setting feature which can be turned on and off with a checkbox. The reason behind this is that many classrooms are too bright during the day and we wanted to avoid the pitfall of the application being too dark while being presented with a projector under these conditions.



Figure 9. UI of the forest scene of our application.

As the last step, a localization manager system was created in order to provide multilingual support. Our primary concern was to make the system easily extendable in order to be more convenient to add more languages in the future (it currently supports English and Hungarian). The localization manager uses JSON files to store expressions as simple key-value pairs. Each language can be represented with a single data file in this way. The user can select the preferred language in the main menu from a dropdown list, and the application instantly loads the translations from the JSON file (Figure 10).



Figure 10. Changing language in the main menu of the application.

CONCLUSIONS

In conclusion, our primary focus was to create a 3D educational programme with the purpose of aiding the learning process of Sprego programming. Sprego is an alternative approach to traditional spreadsheet workflow and it relies on using composite functions and array formulae which are constructed using twelve fundamental functions (Csernoch, 2014).

Our 3D software is based on a previous research project in which the authors developed a 2D visualization application for various fundamental Sprego algorithms (Csapó & Sebestyén, 2018). Our goal was to implement the conditional counting and a linear search algorithm based on this 2D animations.

To achieve this, we had to transform the 2D environments into 3D while keeping the core aspects and advantages of the 2D solution and also implementing new features which we were able to implement because of the 3D environment. We have presented the details of our workflow and our application in the Results subsection.

In the future, we will keep developing the programme by implementing new features and algorithms and extending the range of supported languages. In addition to this, we will gather feedback from different sources in order to have reliable data that helps us in evolving the application in the right direction. Furthermore, we will deploy the software to Google Play to provide easy access for everyone. Moreover, we will test the efficiency of using this application with control groups in high schools and in tertiary education.

REFERENCES

Bell, T. & Newton, H. (2013). Unplugging Computer Science. *Improving Computer Science Education*,

- Routledge.
- Biró, P. & Csernoch, M. (2017). Unplugged tools for building algorithms with Sprego. *International Conference on Education and New Development*, Lisbon, Portugal, June 2017.
- Blender Foundation (2018). Free and Open 3D Creation Software. Retrieved August 10, 2018 from <https://www.blender.org/>.
- Csapó, G. & Sebestyén, K. (2017). Educational Software for the Sprego Method. *The Turkish Online Journal of Educational Technology*, INTE 2017 October, pp. 986-999. Retrieved July 22, 2018 from http://www.tojet.net/special/2017_10_1.pdf. ISSN 2146-7242
- Csapó, G. & Sebestyén, K. (2018). Sprego – Spreadsheet Lego. Retrieved May 30, 2018 from <https://play.google.com/store/apps/details?id=hu.sprego.oktatoprogram>.
- Csapó, G. (2017). Sprego Virtual Collaboration Space. 8th IEEE International Conference on Cognitive Infocommunications, (pp.137-142). Retrieved January 31, 2018 from <http://ieeexplore.ieee.org/document/8268230/>. ISBN 978-1-5386-1264-4. DOI=10.1109/CogInfoCom.2017.8268230
- Csernoch, M., Biró, P., Abari, K. & Máth, J. (2014). Programming-oriented spreadsheet functions. In Hungarian: Programozásorientált táblázatkezelői függvények. *XIV. Országos Neveléstudományi Konferencia*. 6–8 November, 2014. Debrecen, Hungary.
- Csernoch, M. (2014). *Programming with Spreadsheet Functions: Sprego*. In Hungarian: Programozás táblázatkezelő függvényekkel – Sprego. Budapest, Műszaki Könyvkiadó.
- Csernoch, M. (2017). Thinking Fast and Slow in Computer Problem Solving. *Journal of Software Engineering and Applications*, 10(1). Retrieved July 08, 2017 from http://file.scirp.org/pdf/JSEA_2017012315324696.pdf.
- Freiermuth, K., Hromkovič, J., & Steffen, B. (2008). Creating and Testing Textbooks for Secondary Schools. In R. T. Mittermeir & M. M. Sysło (Eds.), *Informatics Education - Supporting Computational Thinking* (pp. 216–228). Berlin Heidelberg, Germany: Springer. Retrieved January 25, 2016, from http://link.springer.com/chapter/10.1007/978-3-540-69924-8_20, pp. 219.
- GIMP (2018). About GIMP. Retrieved August 10, 2018 from <https://www.gimp.org/about/>.
- MagicaVoxel (2018). Magicavoxel by ephtracy. Retrieved August 10, 2018 from <https://ephtracy.github.io/>.
- Microsoft (2018a). LOOKUP function. Retrieved August 10, 2018 from <https://support.office.com/en-us/article/lookup-function-446d94af-663b-451d-8251-369d5e3864cb>.
- Microsoft (2018b). HLOOKUP function. Retrieved August 10, 2018 from <https://support.office.com/en-us/article/hlookup-function-a3034eec-b719-4ba3-bb65-e1ad662ed95f>.
- Microsoft (2018c). VLOOKUP function. Retrieved August 10, 2018 from <https://support.office.com/en-us/article/vlookup-function-0bbc8083-26fe-4963-8ab8-93a18ad188a1>.
- Microsoft (2018d). INDEX function. Retrieved August 10, 2018 from <https://support.office.com/en-us/article/index-function-a5dcf0dd-996d-40a4-a822-b56b061328bd>.
- Microsoft (2018e). MATCH function. Retrieved August 10, 2018 from <https://support.office.com/en-us/article/match-function-e8dff45-c762-47d6-bf89-533f4a37673a>.
- Sebestyén, K. & Csapó, G. (2018). Visualising Sprego Inequality Problems with 2D Representations. *The Turkish Online Journal of Educational Technology*. Accepted.
- Unity Documentation (2018). Unity Scripting API. Retrieved August 10, 2018 from <https://docs.unity3d.com/ScriptReference/index.html>.
- Unity Forums (2018). Unity Forum topics. Retrieved August 10, 2018 from <https://forum.unity.com/>.
- Unity Technologies (2018). Unity - The world's leading content-creation engine. Retrieved August 10, 2018 from <https://unity3d.com/unity>.
- Walkenbach, J. (2010). Microsoft Excel 2010 Bible. Wiley Publishing, Inc. Indianapolis, IN., pp. 202.

Towards better E-Administration of Tertiary Institutions for quality Teacher Education

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Abstract

Information and communication technology (ICT) is important in a rapidly changing world in which work and other activities are increasingly transformed by access to varied and developing technology. The study examined towards better E-Administration of tertiary institutions for quality Teacher education. Two research questions and one hypothesis were formulated to guide the study. The 10 college of education in the south-southern zone of Nigeria were used. A total of 240 respondents (academic and non-academic) administrators purposively selected from the 10 tertiary institutions formed the population. An observation checklist for available and functional facilities, structured questionnaire, focus group discussion for 200 level N.C.E i.e. 10 N.C.E 11 students from each institution were used for data collection. The reliability indices for the instruments obtained through cronbach alpha method was 0.93. The data collected were presented using percentages, mean and standard deviations and the null hypothesis tested at 0.05 level of significance using t-test. It was found that only very few ICT facilities such as flash drives, CD-ROMs amongst others are available. The colleges have low rate of utilization of ICT facilities in the administration of various task areas in the institutions.

Key words: *E-Administration, Tertiary Institutions, Quality teacher Education.*

The need for better Electronic administration of tertiary institutions for quality teacher education cannot be over-emphasized because to attain, interpret and implement the policies, procedures and training requirements of the would be teachers to perform their tasks as teachers within and outside the classroom requires the school administrators ability to utilize information and communication technology (ICT) tools to find, explore, analyze, exchange and present information. Administration in the 21st century has moved from the traditional setting of handling issues manually through the movement of files and documents from one office or table to the other to the transmission of information electronically through wire, wireless cables and sound waves. These changes have ushered in a new dimension which necessitates the acquisition of electronic literacy skills for educational managers and administrators. One of the indices for measuring the growth and development of any nation is hinged on her technological skilled labour force. The level of its manpower and technological skill paves way for her creativity, innovation and higher productivity. The activities in school administration encompasses all the efforts and duties of the school administrator to plan & coordinate all the human and material resources within the school for optimal achievement of the pre-determined objectives/goals of the school.

Effective and efficient data communication and networking facilities are vital to any enterprise like the education sector. For our tertiary institutions to meet their objective and compete favourably in this information age, it is expedient that the necessary information and communication technological facilities be made available in forms of modern computer laboratories, internet services and software packages like Microsoft word, Microsoft excel, data base, Microsoft power point, among others, fully installed and properly utilized. The world as a whole and Nigeria in particular is experiencing population explosion with the consequent increment in enrolment figures in our tertiary institutions each year. This increment in enrolment demands the provision of information and communication technology (ICT) facilities for more effective and efficient administration of educational institution. Such areas where the facilities are needed may include e-learning, research, online assignment, e-library, e-administration amongst others.

ICT embraces all the modern electronic techniques of processing, storing, retrieving and circulating information within and outside an organization with speed and with little or no stress. Jim, (2012) refers to ICT as all

technologies that provide access to information through tele-communications. Hooker (2009) suggested that ICT can be employed in education systems for three purposes: to widen access to education, to raise its quality and reform it. It is therefore obvious that an administrator’s leadership effectiveness and efficiency, management skills and the quality of education service delivery have a direct relationship with the availability and the administrator’s ability to utilize the available ICT facilities for the day to day running of the institution. An administrator cannot take any decision without information which is better obtained through ICT.

Based on this premise, it is the thrust of this paper to discuss the theme: Towards better E-administration of tertiary institutions for quality teacher education.

Theoretical Framework

This study is anchored on the theory of constraints which was propounded by Dr Eliyahu Goldratt in 1984 through his bestselling novel, ‘The Goal’. The theory of constraint is a methodology for identifying the most important limiting factor that stands in the way of achieving a goal and then systematically improving that constraint until it is no longer the limiting factor. The theory of constraints takes a scientific approach to improvement.

The theory of constraints provides a powerful set of tools for helping to achieve that goal, including;

- ❖ The five focusing steps (a methodology for identify and eliminating constraints) i.e. ICT availability and utilization.
- ❖ The thinking process (tools for analyzing and resolving problems) ie Administrator’s thinking process towards achieving quality teacher education through e-administration of tertiary institution.
- ❖ Throughput accounting (a method for measuring performance and guiding management decision) i.e. quality teacher education

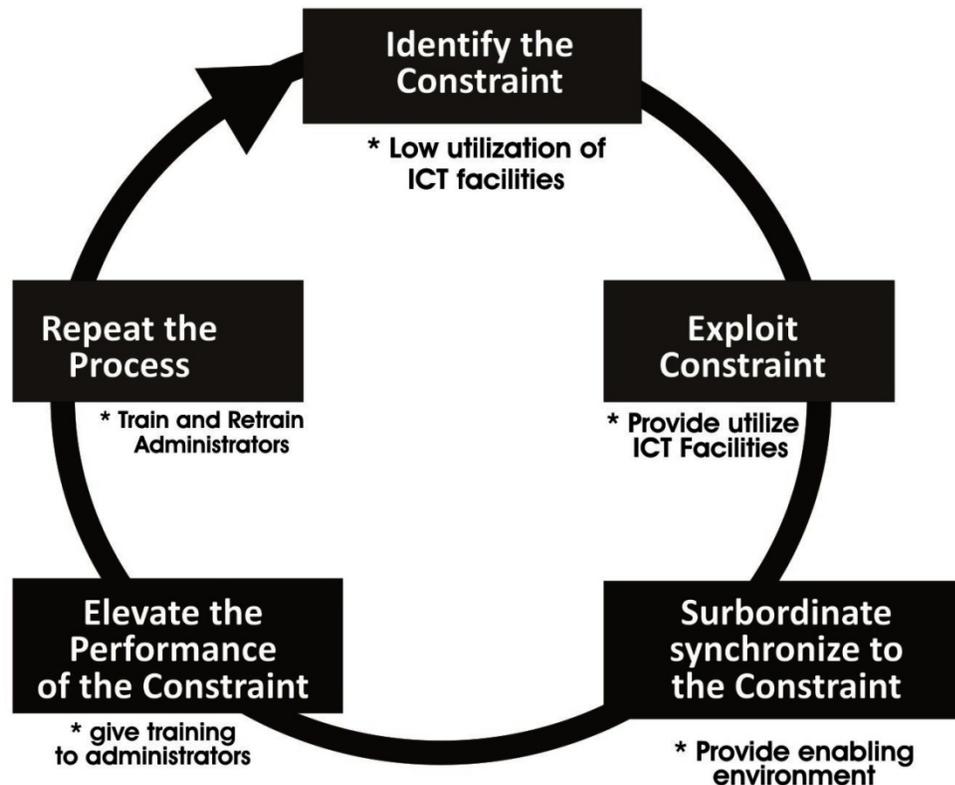


Fig 1: The theory of constraints uses a process known as the Five Focusing steps to identify and eliminate constraints (i.e. Bottlenecks).

Source adopted from Goldratt. 1984.

This theory prioritizes improvement activities by trying to eliminate the current constraints, such as lack of ICT skills, high cost of setting up ICT infrastructure, unavailability of most ICT facilities is used to improve the constraints until it is completely eradicated. This will then lead to tertiary institutions achievement of effective and efficient management of different task areas such as staff personnel services, student personnel service, instructional service delivery and academic planning of tertiary institutions for quality teacher education.

Research Questions

The following research questions guided the study;

1. What ICT facilities are available for the administration of tertiary institution in south south Nigeria.
2. To what extent are the available ICT facilities adequate for effective administration of tertiary institutions in south south Nigeria.

Hypothesis

The following hypothesis was tested at probability level of 0.05 level of significance.

HO₁: there is no significant difference between the mean rating scores of academic and non-academic administrators on the adequacy of ICT facilities in tertiary institutions.

Methodology

The design of the study is descriptive survey research design. The design is also analytic survey because according to Nwankwo (2011), the variables being studied for any sample are compared for the various identified strata or categories of the sample; in this case, Academic and non-academic administrators in both federal and state government owned tertiary institutions through the use of hypothesis.

Area Of The Study

The area of study is the South-south zone of Nigeria. The states in the area include Akwa-Ibom, Bayelsa, Cross Rivers, Delta, Edo and Rivers States. These states are located in the South-Southern part of Nigeria.

Population Of The Study

The population for the study consist of 10 federal and state colleges of education in South South zone of Nigeria. The population of the respondent for this study is 240 academic and non academic administrators which consist of Dean, Heads of department, Coordinators of programmes, registrar, deputy registrars etc.

Instrument For Data Collection

In this study, a structured questionnaire and a check list for available ICT facilities and focus group discussion of selected 200 level students were instrument for data collection.

The questionnaire items were generated based on the research questions to elicit information from academic and non-academic administrators in the colleges of education in South South zone. The questionnaire, has items for answering research question 2 with response options (AV), (NA), (VAQ), (A), (LA) and (VLA) which means Available, Not available, Very adequate, Adequate, Less adequate and Very less adequate. While a checklist of 24 items was used to ascertain if these facilities are available in the colleges of education under survey and whether they are functional. A rater/researcher/research assistant is expected to identify and check those facilities available, the number available and whether they are functional.

Method Of Data Analysis

Research questions one was answered and analyzed using percentages while research questions 2 was answered using mean rating based on real limit of numbers on a four point scale as follows: 0.50 – 1.49 – Very less adequate, 1.50 – 2.49 – Less adequate, 2.50 – 3.49 – Adequate. The focus group was qualitatively analyzed.

t-test was used to test the hypothesis at $P \leq .05$

Results

Research question one

What are the ICT facilities available for the management of Colleges of Education in South-South Nigeria?

The data for answering the above research question are provided on Table 1 below.

Table 1: Frequency and percentages of ICT facilities available in colleges of Education in South-South, Nigeria (N = 10)

S/N	FACILITIES	ACADEMIC PLANNING UNIT		STAFF PERSONNEL UNIT		STUDENT PERSONNEL UNIT		INSTRUCT, SERVICE DELIVERY		TOTAL	%
		Freq	%	Freq	%	Freq	%	Freq	%		
1	Internet-connected laptop	7	70	10	100	8	80	9	90	34	85
	Internet-connected desktop										
2	Computer	10	100	10	100	9	90	8	80	37	93
3	Scanner	7	70	6	60	8	80	9	90	30	75
4	Electronic Library	0	0	0	0	0	0	7	70	7	18
5	Institutional Cybercafe	9	90	5	50	4	40	9	90	27	68
6	Fax (facsimile) machines	2	20	2	20	2	20	3	30	9	23
7	Department / School email address	2	20	5	50	10	100	2	2	21	53
8	CD-ROMs	10	100	10	100	10	100	10	100	40	100
9	Flash drives	10	100	10	100	10	100	10	100	40	100
10	Computer Laborator	0	0	0	0	0	0	4	40	4	10
11	Multimedia Projector	-	0	-	0	1	10	7	70	17	43
12	Interactive Board	1	10	0	0	0	0	6	60	7	18
13	Digital Camera	-	0	-	0	0	0	10	100	10	25
14	Institution Website	8	80	6	60	7	70	7	70	28	70
15	Dept/School Website	-	0	3	30	4	40	4	40	11	28
16	Management/Administrative software packages	1	10	0	0	0	0	1	10	2	5
17	Risograph Machine	1	10	0	0	1	10	1	10	3	8
18	Institutionally-produced educational software	-	0	0	0	1	10	1	10	2	5
19	College e-mail address	8	80	8	80	8	80	10	100	34	85
20	Computer-Networking (Local Area Network)	5	50	5	50	5	50	4	40	19	48
21	Computer -Networking (Wide Area Network)	3	30	3	30	3	30	3	30	12	30
22	Examination scoring machine or OMR reader	-	0	0	0	0	0	0	0	0	0
23	Multimedia classrooms (Audio Visual Centre)	0	0	0	0	0	0	5	50	5	13

Freq = Frequency; % = Percentage. Source: FILED STUDY

Data on Table 1 reveal that items 1,2,3,5,8,9,14,19 and 20 had high frequency and percentage scores for availability of ICT facilities for the management of academic planning task area in colleges of education as follows: 7(70%), 10(100%), 7(70%), 9(90%), 10(100%), 10(100%), 8(80%), 8(80%) and 5(50%) and very low frequencies and percentages for items 4,6,7,10,11,12,13,15,16,17,18,21,22 and 23 as follows: 0(0%), 2(20%), 2(20%), 0(0%), 1(10%), 0(0%), 0(0%), 1(10%), 1(10%), 0(0%), 3(30%), 0(0%), 0(0%) and 0(0%). The summary of the checklist table for academic planning task area show that the internet-connected laptop, internet-connected computers, scanner, institutional cybercafé, CD-ROMS, flash drives, institution website, college e-mail address and computer-networking (Local Area Network) were available ICT facilities for academic planning task area in colleges of education. While Electronic library, fax(facsimile) machines, Department e-mail address, Computer Laboratory, multimedia projector, interactive board, digital camera, dept/school website, management/administrative software

packages, Risograph machine, institutionally – produced educational software, computer-Networking (Wide Area Network), Examination scoring machine (OMR), multimedia classrooms(Audio visual centre) were not available ICT facilities for academic planning task area in colleges of education in South-South, Nigeria.

The data in table 1 also reveal that items 1,2,3,5,7,8,9,14,19 and 20 exhibit high frequency and percentages scores of available ICT facilities for management of staff personnel services in Colleges of Education as follows; 10(100%), 10(100%), 6(60%), 5(50%), 5(50%), 10(100%), 10(100%), 6(60%), 8(80%) and 5(50%). There are low frequency and percentage scores for items 4,6,10,11,12,13,15,16,17,18,21,22, and 23 as follows:0(0%), 2(20%), 1(10%), 0(0%), 0(0%), 3(30%), 0(0%), 0(0%) 0(0%), 3(30%), 0(0%), and 0(0%) respectively. The summary for staff personnel services show that internet-connected laptop, internet-connected desktop computers, scanners institution cybercafé, Department/school email address, CD-ROMS, flash drives, college email address and computer-Networking (LAN) were available ICT facilities, while electronic library, fax (facsimile), machines, computer laboratory, multimedia projector, interactive Board, Digital camera, Dept/School website, management/administrative software, packages Risograph machines , institutionally produced educational software, computer-Networking (Wide Area Network), Examination scoring machine (OMR) and multimedia classrooms (Audio Visual Centre) were not available ICT facilities for management of task area of staff personnel services in Colleges of Education in South South, Nigeria.

The Table also further reveal that items 1,2,3,7,8,9,14,19 and 20 show high frequency and percentage scores of ICT facilities available for management of student personnel services as follows: 8(80%), 9(90%), 8(80%), 10(100%), 10(100%), 10(100%), 7(70%), 8(80%), and 5(50%). There are low frequency and percentages scores for items 4,5,6,10,11,12,13,15,16,17,18,21,22, and 23 as follows: 0(0%), 4(40%), 2(20%), 0(0%), 1(10%), 0(0%), 0(0%), 4(40%), 0(0%), 1(10%), 1(10%), 3(30%), 0(0%), 0(%), and 0(0%) respectively. The summary of the checklist for task area of student personnel services show that internet-connected laptop, internet-connected desktop computer, scanner, Dept/School email address, CD-ROMs, flash drives, institution website, Colleges email address and computer-Networking (WAN) were available ICT facilities, while electronic library, institutional cyber café', fax (facsimile) machines, computer laboratory, multimedia projector, interactive Board, digital camera, Dept/School website, management/Administrative software packages, Risograph machines, institutionally – produced educational software, Computer – networking (WAN) Examination scoring machine (OMR) and multimedia classrooms (Audio Visual Centre) were not available ICT facilities for management of task areas of student personnel services in College of Education in South South, Nigeria.

The findings is in line with the results of the focus group discussion for students' in the colleges of education which revealed that internet services are not always available and functional, hence the students' are always left at the mercy of private cybercafe's providers outside the school. In addition, the few available ICT facilities are not accessible to student to the extent that some students have not come near the computers since they were admitted into the college.

However, the table finally reveal that items 1,2,3,4,5,8,9,11,12,13,14 and 23 show high frequency and percentage scores respectively of ICT facilities available for instructional services as follows: 10(100%), 8(80%), 9(90%), 7(70%), 9(90%), 10(100%), 10(100%), 7(70%), 6(60%), 10(100%), 7(70%), and 5(50%) and low frequency and percentage scores for items 6,7,10,15,16,17,18,20,21,22 and 23 as follows: 3(30%), 2(20%), 4(40%), 4(40%), 1(10%), 1(10%), 1(10%), 4(40%), 3(30%), 0(0%), and 0(0%) respectively. Therefore, the table shows that internet-connected laptop, internet-connected desktop computers, scanner, electronic library, institution cybercafé, CD-ROMs, flash drives, multimedia projector, interactive Board, Digital Camera, institution website, college email address and multimedia classrooms (Audio Visual Centre) are available ICT facilities for management of different task area in colleges of education. Fax (facsimile) Machines, Department/School email address, computer laboratory, department/ school website, management/administrative software package, risograph machines, institutionally-produced educational software, computer-Networking (LAN) Computer-Networking (WAN) and OMR reader or examination scoring machine (OMR) are not available ICT facilities for management of different task area in colleges of education in South South, Nigeria. The ICT facilities that are available for the management of colleges of education in South South Nigeria are Internet-connected laptop, Internet-connected desktop computer, scanner, institutional cybercafé, departmental/school email address, CD-ROMs, flash drives, institution website, college email address, computer-Networking (Local Area Network).

Research Question Two:

To what extent are the available ICT facilities adequate for effective management of staff personnel services, Students affairs, instructional management and Academic planning of colleges of education?

The data for answering the above research question are provided on Table 2.

Table 2: Mean and standard deviation of adequacy of available ICT facilities in the management of colleges of education. (N = 240)

S/NO	ICT FACILITIES	Mean x	Std. Deviation	Decision	Mean of TASK AREAS			
					Staff.	Student.	Instr.	Acad. P
1	Internet-connected laptop	2.13	1.11	LA	2.29	2.00	2.50	1.33
2	Internet-connected desktop Computer	2.24	1.12	LA	2.13	2.00	2.70	1.67
3	Scanner	2.13	1.01	LA	2.67	1.71	2.23	1.83
4	Electronic Library	2.10	0.95	LA	2.33	1.87	2.00	2.16
5	Institutional Cybercafe	2.57	1.07	A	2.77	2.33	2.53	2.57
6	Fax (facsimile) machines	2.00	1.05	LA	2.00	1.75	2.08	2.00
7	CD-ROMs	2.91	1.09	A	3.28	3.25	2.64	2.85
8	Flash drivers	2.80	1.10	A	3.12	2.80	2.63	2.66
9	Dept/School website	2.30	1.02	LA	2.42	2.16	2.46	1.75
10	Computer Laboratory	2.19	0.98	LA	2.22	2.25	2.16	2.16
11	Multimedia Projector	2.30	1.06	LA	2.33	2.00	2.45	2.16
12	Interactive Board	1.92	1.08	LA	2.60	2.00	1.90	1.33
13	Digital Camera	2.20	1.10	LA	2.20	2.00	2.33	2.00
14	Institution website	2.85	0.92	A	3.57	2.40	2.62	2.66
15	Management/ Administrative software packages	2.33	1.11	LA	2.33	2.75	2.09	2.50
16	Rizograph machine (RZ)	2.04	1.07	LA	2.66	1.80	2.00	1.50
17	Institutionally-produced educational software	1.87	0.82	LA	2.00	1.83	1.75	2.00
18	Computer -Networking (Local Area Network)	2.13	0.98	LA	2.00	2.66	2.00	2.00
19	Computer-Networking (Wide Area Network)	2.00	0.92	LA	2.00	2.40	2.00	1.66
20	Examination scoring machines (OMR)	1.52	0.89	LA	1.60	1.50	1.50	1.50
21	Department / School email address	2.14	1.08	LA	1.57	2.66	2.33	2.00
22	College e-mail address	2.86	0.81	A	2.62	2.85	2.85	3.16
23	CD player	2.55	1.06	A	2.83	3.25	2.41	2.14
24	Multimedia classrooms (Audio Visual Centre)	2.03	0.93	LA	2.25	3.00	1.81	1.57
	Cluster mean.	2.33	0.70	LA	2.40	2.30	2.33	2.05

Source: field study

Table 2 showed the mean and standard deviation of adequacy of available ICT facilities in the management of colleges of education in South-South Nigeria. Items 1 to 4 have low scores of 2.13, 2.24, 2.13, and 2.08 with standard deviation of 1.11, 1.12, 1.01 and 0.96 respectively. These indicate that: internet connected laptops, internet connected desktop computers, scanners and electronic library were less adequate for the management of colleges of education. Item 5 has a mean score of 2.57 and standard deviation of 1.07. This means that institutional cybercafé was adequate for the management of colleges of education. Items 7 and 8 have means scores of 2.91 and 2.80 with standard deviation of 1.09 and 1.10 respectively. These show that CD-ROMs and flash drives were adequately available for the management of colleges of education. Items 9 – 13 have low mean scores ranging from 1.92 to 2.30 with standard deviation ranging from 0.92 – 1.10. these mean that Department/School website (x = 2.30, SD = 1.02), Computer laboratory. (x = 2.19, SD = 0.98), multimedia projector (x = 2.20. SD = 1.06), interactive board (x = 1.92, SD = 1.08), Digital Camera (x = 2.20, SD = 1.10) were less adequate for management of colleges of education. Item 14 have a mean score of 2.85 and Standard Deviation of 0.92. This indicates that institutional website was adequate for the management of colleges of education. Item 15 has a mean score of 2.33 and Standard Deviation of 1.11. This indicates that management/administrative software packages were less adequate for the management of colleges of education. Item 16 have a mean score of 2.04 and Standard Deviation of 1.07. This shows that Risograph machines

(RZ) were less adequate for the management of colleges of education; Item 17 has a mean score of 1.87 and standard deviation of 0.82. This means that institutional produced educational software was less adequate for the management of colleges of education. Item 18 have a mean score of 2.13 and standard deviation of 0.98. This means that computer-networking (Local Area Networking) was less adequate for the management of colleges of education. Item 19 have a mean score of 2.00 and standard deviation of 0.92. This means that computer-networking (Wide Area Network) was less adequate for the management of colleges of education. Item 20 and 21 have mean scores of 1.52 and 2.14 with standard deviations of 0.89 and 1.08 respectively. These mean that examination scoring machine (OMR) and Department/School email addresses were less adequate for the management of colleges of education. Items 22 and 23 have high mean scores of 2.86 and 2.55, and standard deviation of 0.81 and 1.06. These indicates that colleges email address and CD players were adequate for the management of colleges of education. Items 24 have mean scores of 2.03 with standard deviation of 0.93. These indicate that multimedia classroom (Audio Visual Centre) were less adequate for the management of colleges of education. Finally the cluster mean 2.33 and standard deviation of 0.70 indicate that ICT facilities were less adequate for the management of colleges of education in South South, Nigeria. Specifically ICT facilities for staff personnel services with a mean of 2.40, student personnel service 2.30, Instructional service delivery with a mean score of 2.05 and Academic planning with a mean score of 2.05 are less adequate.

Educational Implications

The findings of this have far reaching educational implications for quality teacher education in Nigeria in particular and the global community in general. The results have provided empirical evidence of low state of availability and poor ICT utilization in the administration of colleges of education in South South Nigeria toward E-administration of tertiary institutions for quality teachers education.

The implications of the finding are that the tertiary institutions are not ICT- compliant in the administration of the task areas.

Recommendations

1. The government should equip school ICT laboratories with functioning computers and internet services.
2. The government should institute and enforce ICT literacy and utilization as criteria for promotion of both academic and non-academic administrators in tertiary institutions.

Reference

- Felicia .O. Mormah: Application of ICT in E-Administration in tertiary institutions: prospects and challenges www.globalacademicgroup.com , journals Retrieve. 23/2/18
- Goldrat E.M (1984) The theory of constraints-Retrieved [https://en.wikipedia.org/wiki.Theory-1/3/18](https://en.wikipedia.org/wiki/Theory-1/3/18)
- Hooker, M. (2009). The use of ICT in Teacher Professional Development Dublin, Ireland. Retrieved February 19, 2015 from Mary.hooker@gesci.or
- Jim, R (2012), Retrieve May 19, 2014 from www.tutor2u.net/business/ict/introwhatisict.html
- Nwankwo O.C. (2011) A partial Guide to Research writing for students of research enterprise. (Revised Fourth Edition) Nigeria. Pan-unique publishers Co-Ltd.
- Sapru (2009) Administrative theories and management through. 2nd Edition. New Delin – 110001.

Usability Analysis Of The Mobile Instruction For Computer Programming: The Comparison Of The User Satisfaction Based On The Task Completion Time

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Abstract

Accessing information gains more importance than ever before. The developments made in this direction affect all segments of the society. Now people are in the effort to reach the right information faster and more effectively. Mobile application market is growing in an astonishing speed. There are many players in the mobile application market who develop applications. Among many alternative, users decide which application to use or not in few seconds after seeing the interface of the applications. The most important point in providing continuity in the rapidly growing mobile application world is developing useful applications. In an effort to increase the usability of the mobile application this study is designed to investigate whether the user satisfaction changes based on the task completion time for the mobile instruction which is designed to learn the Hypertext Markup Language. Participants of the study are selected from the students of the Department of Computer Education and Instructional Technologies. All participants have passed the English Proficiency exam. The adopted questioner was used to measure the user satisfaction. The study participants have completed the freely available mobile application designed to learn the Hypertext Markup Language. The application can run on Android and iOS mobile operating systems. The mobile application has several learning modules. Users have to complete each module in order to proceed to the next module after answering all questions correctly at the end of the each module. Findings of the study revealed that users who complete the activities on mobile application faster are more satisfied from using the mobile applications than the other users. Therefore, it is suggested that while developing mobile applications, time to complete the application must be taken into account to increase user satisfaction. The usability test must be completed before the release of the mobile applications. Therefore, developers of the mobile applications should pay attention to the task completion time to increase the sale rates in the mobile application market.

Keywords: *Usability testing, mobile application, user satisfaction, task completion time*

Introduction

With advancing technology, accessing information gains more importance every day. The developments made in this direction affect all segments of the society to a great extent. Now people are in the effort to reach the right information faster and more effectively. In the past, people who have had to visit the libraries to reach information, now can quickly access information from their computers through the development of the internet. Even this speed has begun to lose its validity to people over time. As a result, the mobile age began to show itself. People, today, have instant access to information with their mobile devices. There are about 5 billion mobile users worldwide for 2017 (Statista, 2018). This shows the tendency to mobile devices.

These developments brought with it a number of questions and problems. How impressive are mobile apps for end users? Can people use mobile applications comfortably? The availability of answers to these questions comes into play. Usability can be examined with various parameters such as efficiency, productivity, learnability, memorability, error, satisfaction, flexibility and attitude (Nielsen, 1994). Usability testing of mobile devices is an emerging area of research (Beck, et al., 2003).

The purpose of this study is to compare the user satisfaction rate based on the task completion time. Therefore, the research question of this study is; "Does the user satisfaction rate change based on the task completion time? There are numerous publications in the literature about the design phase or usability testing done on an existing application. Namlı (2010) conducted a study for the Turkey's first mobile banking application. Results revealed that the availability of mobile applications will increase with the development of user-friendly interface components. One of the usability tests conducted for mobile applications in the literature was conducted on mobile web sites of Middle East Technical University, Koç University and Sabancı University by (Özen-Çinar, 2015). The aim of the research was to investigate usability issues of mobile websites of these universities. According to the results, it is seen that the websites of universities have higher participant satisfaction than mobile web sites. Designs are not mobile responsive, inconsistent navigation between main pages and sub-pages, small font sizes and user interface problems caused by uneven page structures are basic problems for mobile design.

Regarding the impact of the availability of mobile applications, the usability is found to be the most important element after the security for the user's acceptance of the application (Ryan & Gonsalves, 2005). Usability studies have been used for many years in the Human-Computer Interaction research for the purpose of improving the technology-based products and services and making them easy to use (Hallahan, 2001). In this context, when an application is being developed, the approaches of users who will use it should be foregrounded. Otherwise, users will not be able to use these applications. According to Norman and Draper's User Centered System Design (1986), the focus shifts from system to user in the design (Norman and Draper, 1986) because users decide to use or give up within few seconds of seeing an interface. This situation puts the importance of satisfaction in mobile applications. The completion time of tasks affects to user satisfaction (Çağiltay, 2011).

User Centered Design

The User Centered Design approach is an interactive system development approach that focuses on increasing the usability of system interfaces based on the needs of users. In User Centered Design, users are directly involved in the design process. The methods of this design were described by K.D. Easton in 1982 with the following scheme (Userspots, 2009).

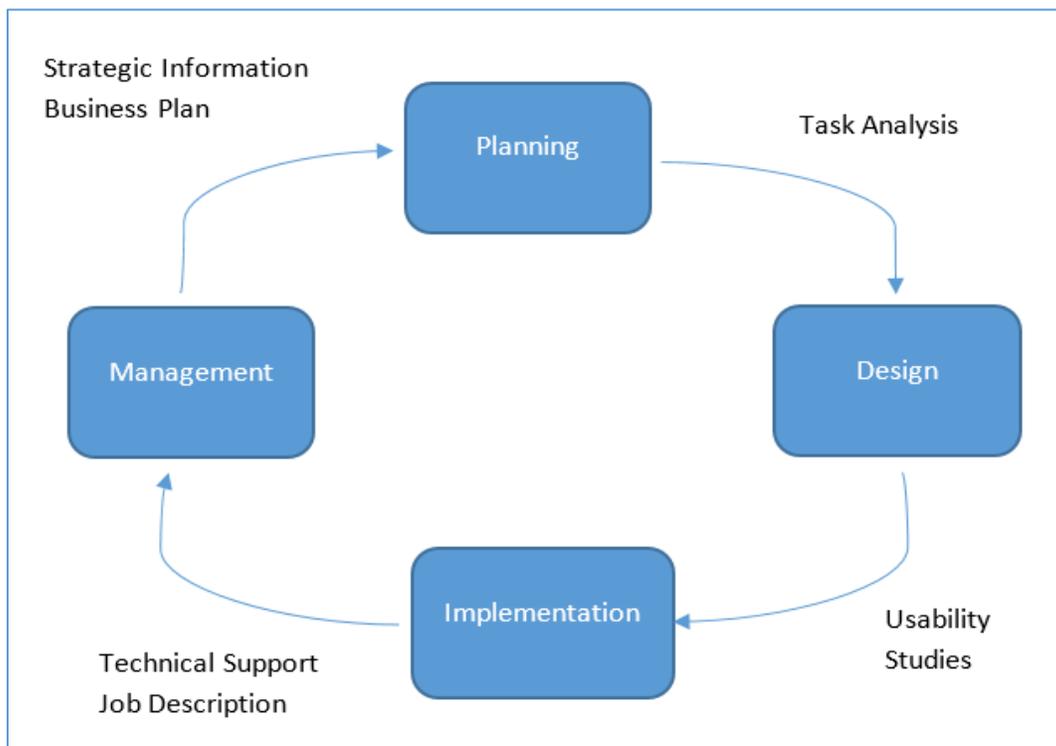


Figure 1: User centered design life cycle (Userspots, 2009).

According to the Figure-1, the user-oriented design consists of successive and recurring Planning, Design, Implementation and Management methods. Usability tests are also taking place between the design and implementation in this design model.

What is Usability?

Usability is defined as the ability to use tasks specified in an application easily and effectively in appropriate environmental conditions, after the necessary training and technical support is given by the users identified as the target audience (KAMIS, 2018). Effective use of a product, users' accuracy and completeness for specific purposes; efficient use is assessed by measuring the resources spent on accuracy and completeness of the goals achieved (ODTU, 2018). According to Nielsen, usability is mainly examined under five headings: learnability, efficiency, memorability, errors and satisfaction (Nielsen, 1994).

- Learnability means how easily the system can be learned.
- Efficiency means how efficiently the learned system can be used
- Memorability refers to the ability to easily remember the use of the system when it is used again after a

certain period of inactivity

- Errors indicate that the error rate of users is low and can be easily corrected when error is made.
- Satisfaction is the satisfaction of using the system of users and the measure of positive or negative thoughts

Usability Measurements

Tests are made before the product is marketed. User testing with real users is the most common and the most basic method of evaluation (Kılıç and Güngör, 2006). The persons representing the user's group are made to implement on the system. The user tests are carried out in human-computer interaction laboratories specially prepared for usability measurements. In these measurements, participants use a software (web site, game, educational software) while the movements of the pupils are being monitored and the environment is being recorded with the camera (ODTU, 2018).

The Study

Participants

Students of the Department of Computer Education and Instructional Technologies were selected as participants for this study. Since the mobile application is in English language, participants were selected among those who know English. Twelve students participated in the usability study. According to Nielsen (1994) the minimum number of users needed for usability testing should be five so the number of participants selected in this study is enough for the usability testing. Four participants are woman and the others are man. Their ages range between 22 and 24.

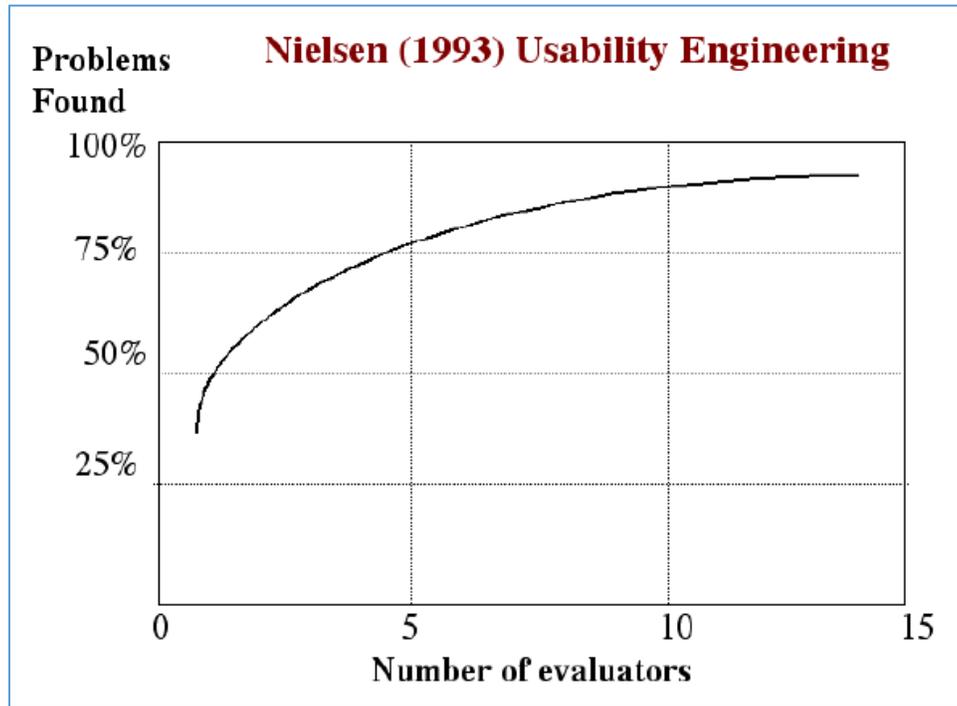


Figure 1: Number of problem found and the number of evaluators (Nielsen, 1994)

Measurements

The Website Analysis and Measurement Inventory (WAMMI) questionnaire was modified for the mobile application and it was used for the data collection. The questionnaire was created to assess the user satisfaction rate of the selected application because usability questionnaire is directly related to the end user, with easier and faster results when compared with laboratory evaluations, expert opinions and checklist use (Hartson, & Hix, 1988). In order to learn the background of users, questions regarding the demographic information were added to the questionnaire.

Steps of the Study

After the identification of the tasks that users will complete during the study, the study was completed in five steps. Initially users were trained to use the mobile application for the Hypertext Markup Language. Then time count was initiated after given users direction to start using the applications. Users were asked to use the mobile applications

(Figure 4, Figure 5). The time count was terminated for users who finish using the mobile application. Then the total time to complete the mobile application was calculated. At the end of the study, users were asked to complete the questioner measuring the user satisfaction rate. The steps of the study is presented in Figure-3.

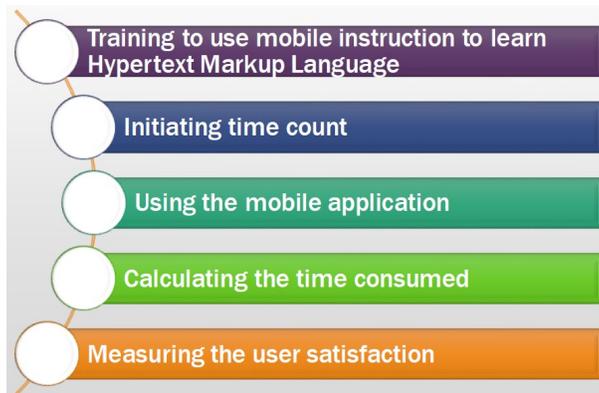


Figure 2: Steps of the study

Mobile Application

The mobile application freely available for the users to learn the Hypertext Markup Language was chosen for the study. The application can run on Android and iOS mobile operating systems. The mobile application has several learning modules. Users have to complete each module in order to proceed to the next module after answering all questions correctly at the end of the each module.

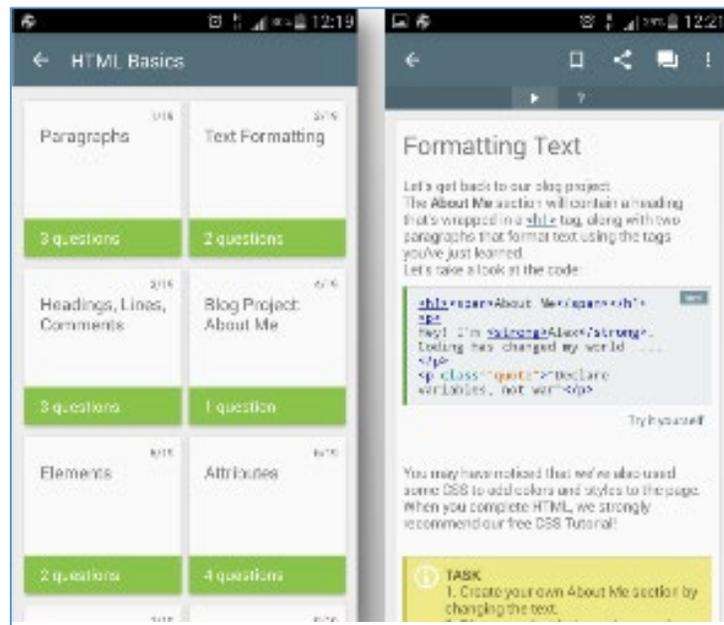


Figure 3: The sample interfaces of the mobile application

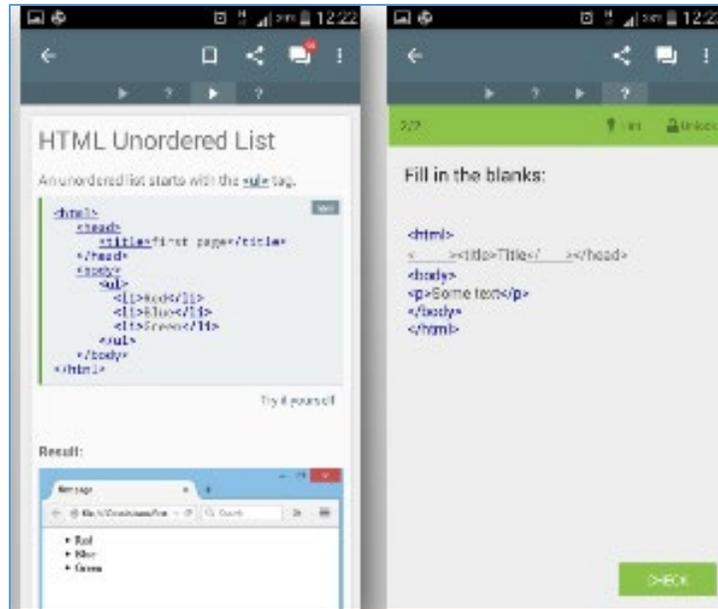


Figure 5: The sample interfaces of the mobile application

Analysis

The average users can complete the planned tasks in the study in five minutes. Based on the task completion time, participants of the study were divided in two groups. 8 participants completed the given tasks under five minutes while others finished the tasks in more than five minutes. The user satisfaction rate of the participants was compared using the Mann Whitney U-Test.

Findings

The user satisfaction rates of the participants were presented in Table 1. Results show that users are satisfied from using the mobile application to learn the Hypertext Markup Language. In order to compare the user satisfaction rates of the participants who complete the mobile application in less than 5 minutes and participants who complete the application in more than five minutes, the Mann-Whitney U Test was used. Results of the analysis indicated that user satisfaction rates of participants who complete the mobile application in less than five minutes are higher than the participants who complete application in more than five minutes ($U=0,0, p < 0,05$).

Table 1: The user satisfaction rate of participants

	Strongly Disagree	Disagree	Natural	Agree	Strongly Agree
	%	%	%	%	%
I can access the information easily in this mobile application	0	25	8,3	66,7	0
Mobile application seems to be logical for me	0	8,3	25	25	41,7
Application interfaces in the mobile application are attractive	0	25	16,7	58,3	0
I feel I have the control when using the mobile application	0	33,3	0	16,7	50
I have difficulty to find the location to go on the mobile application	25	41,7	0	33,3	0
It is easy to understand everything on this mobile application	0	16,7	0	66,7	16,7
I feel sufficient when using this mobile application	0	0	33,3	16,7	50
I did not have any difficulty when first using	0	33,3	0	33,3	33,3
Using the mobile application is difficult	50	16,7	16,7	16,7	0
I enjoy using the mobile application	0	33,3		66,7	0

Table 2: The comparison of the user satisfaction rate based on the task completion time

Task completion times	n	Mean Rate	sd	U	p
Less than 5 minutes	8	8,5	1	0,0	0,006
More than 5 minutes	4	2,5			

Conclusion

Accessing information gains more importance than ever before. The developments made in this direction affect all segments of the society. Now people are in the effort to reach the right information faster and more effectively. However, the most important point in providing continuity in the rapidly growing mobile application world is developing useful applications. In an effort to increase the usability of the mobile application, this study is designed to investigate whether the user satisfaction changes based on the task completion time for the mobile application which is designed to learn the Hypertext Markup Language. Findings of the study revealed that users who complete the activities on mobile application faster are more satisfied than the other users. Therefore, it is suggested that while developing mobile applications, time to complete the application must be taken into account to increase user satisfaction. It is important to pay attention to the fact that the usability test should be completed before the release of the mobile applications on market.

References

- Statista, (2018). Mobile phone users worldwide 2013-2019 Retrieved June 1, 2018, from <https://www.statista.com/statistics/274774/forecast-of-mobile-phone-users-worldwide/>
- Nielsen, J. (1994, April). Usability inspection methods. In *Conference companion on Human factors in computing systems* (pp. 413-414).
- Hallahan, K. (2001). Improving public relations web sites through usability research. *Public Relations Review*, 27(2), 223-239.
- Norman, D.A., Draper, S.W. (1986). *User centered system design: New perspectives on human-computer interaction*
- KAMİS, (2018). Kullanılabilirlik Nedir?. Retrieved June 1, 2018, from https://kamis.gov.tr/?page_id=19
- ODTU, (2018). İnsan-Bilgisayar Etkileşimi Araştırma ve Uygulama Laboratuvarı Retrieved June 1, 2018, from <https://hci.cc.metu.edu.tr/tr/kullanilabilirlik>
- Userspots (2009). Kullanıcı Odaklı Tasarım Metodları. Retrieved June 1, 2018, from <http://www.userspots.com/kullanici-odakli-tasarim-metodlari/>.
- Namlı, Ç. (2010). *Mobil uygulama kullanılabilirliğinin değerlendirilmesi* (Doctoral dissertation, Fen Bilimleri Enstitüsü).
- Çinar, N. Ö. (2015). *Usability evaluation of mobile and desktop websites: a study of comparing usability evaluation methodologies* (Doctoral dissertation, Middle East Technical University).
- Beck, E. T., Christiansen, M. K., Kjeldskov, J., Kolbe, N., & Stage, J. (2003, November). Experimental evaluation of techniques for usability testing of mobile systems in a laboratory setting. In *proceedings of Ozchi* (pp. 106-115).
- Ryan, C., & Gonsalves, A. (2005, January). The effect of context and application type on mobile usability: an empirical study. In *Proceedings of the Twenty-eighth Australasian conference on Computer Science-Volume 38* (pp. 115-124).
- Hartson, H. R., & Hix, D. (Eds.). (1988). *Advances in human-computer interaction* (Vol. 2). Intellect Books.
- Kılıç, E., & Güngör, Z. (2006). Web site tasarımlarında kullanılabilirlik değerlendirme yöntemlerinin önemi. *Akademik Bilişim Konferansı*.
- Nielsen, J. (1994). *Usability engineering*. Elsevier.
- Çağiltay, K. (2011). *İnsan bilgisayar etkileşimi ve kullanılabilirlik mühendisliği: Teoriden pratiğe*. ODTÜ Geliştirme Vakfı Yayıncılık.

Use Of Google Drive And Whatsapp For The Follow-Up And Development Of The Final Master's Project Through M-Learning

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Abstract

Mobile Learning can be defined as the teaching-learning process that takes place at any place and time, thanks to the use of mobile devices with wireless connection. These tools allow us to access the required information through the network. In this study we analyse the influence of Google Drive and WhatsApp Application to investigate and develop the final Master's Project in students enrolled in the Master's Degree in Teacher Training in Compulsory Secondary and Upper Secondary School Education, Vocational Training and Language Teaching in the Campus of Ceuta. In this case the research has been applied to a group of six volunteer students. It is a descriptive method with an analysis developed from a qualitative approach. In order to obtain the research results, an outline for a half-structured interview was elaborated and validated by content validity. The interviews were individual and recorded for later transcription and ordering. The results show that students value the experience in a positive way, highlighting the possibility of asking and solving doubts through WhatsApp anywhere and anytime, not only with the teacher, but also with the opinion and participation of the rest of classmates, being able to see and solve the inadequate aspects that arose in the elaboration of the final Master's Project through the teacher's comments. As a conclusion we can argue that the experience was positive, adapted to the students' style and learning rhythm, receiving a positive feedback in less than 48 hours for writing the final Master's Project and solving the doubts along its creation.

Introduction

Technologies have permeated with great force in the lives of all citizens, although to a greater extent in the lives of the youngest people. Up to a point that we have begun to speak of "digital bottle" which is nothing more than the mixture of large doses of computer, video games, Internet and mobile (Castell, 2003), not conceiving our existence without search engines, email, WhatsApp or social networks (Del Barrio & Ruíz Fernández, 2014).

So much so, that we can say that we are witnessing one of the main changes that are taking place in society in recent years, due to the unbridled development of Information and Communication Technologies (ICT). These changes are taking place in all areas of society: communication, organization, work, fun, searching for information, way of relating, and, to a greater extent, in education (Raposo-Rivas & Salgado-Rodríguez, 2015).

Regarding education, now it is possible to bring cultures closer through the different tools of instantaneous communication, both synchronous and asynchronous, that the network offers us, with a very high flexibility for sending and receiving all kinds of information and multimedia elements in different formats (Leiva-Olivencia, Moreno-Martínez & Peñalva, 2016):

- Chat and / or video conference: Skype; WhatsApp; Hangouts; Line; Telegram
- Email: Hotmail; Gmail; Yahoo
- Social networks: Twitter; Facebook
- Cloud storage: Google Drive.

The present study has precisely been carried out with the objective of analyzing to what extent two of these tools, Google Drive and WhatsApp, can influence the follow-up and development of the final Master's project in students of the Master's Degree in Teacher Training in Compulsory Secondary and Upper Secondary School Education, Vocational Training and Language Teaching in the Campus of Ceuta.

Carrying out this study has been considered necessary to know the teaching and learning process, These two resources are mainly associated with the mobile learning methodology, understanding this as *"the learning that occurs from the mediation of mobile digital devices"* (Aznar-Díaz, Romero-Rodríguez & Rodríguez-García, 2018, p. 259).

Theoretical Framework

M-Learning

The Mobile Learning as a topic of research in educational technologies, had its beginning in the first decade of this century. Its main characteristic is ubiquity, that is, the teaching and learning process can be carried out at any time and place. At first it could be associated with any mobile technology, but if we focus on the educational field, three stand out: tablets or digital tablets, smartphones or smart mobile phones and phablets, a device resulting from the combination of the previous two (Brazuelo & Gallego, 2014).

In this line Sharples and others (2007) cited in Padrón (2013, p.127)) consider that Mobile Learning "is a combined experience on five main axes", which are (Table 1):

- Mobility in the physical space
- Mobility in a conceptual space from a personal interest that evolves
- Mobility in the social space in the different social dimensions in which we move, and finally
- Learning dispersed over time, as a cumulative process that gathers a great variety of experiences in formal and informal contexts.

Table 1: Mobility characteristic of Mobile Learning

Mobility characteristic	Description
PHYSICAL SPACE	Learning is not linked to a specific physical space. Mobile technologies allow us to release moorings in the physical space.
MOBILE DEVICE	Portability of devices: Telephones, PDAs, laptops. Access to information and resources in any space and time through mobile digital networks: Wireless.
CONCEPTUAL SPACE	Learning starts from a personal interest and advances and is modified according to personal interests and curiosity.
SOCIAL CONTEXT	Learning occurs in the different social contexts in which we participate: family, work, school...
DISPERSION IN TIME	Learning is a cumulative process that gathers a great variety of experiences in formal and informal contexts.

Source: Padrón (2013, p. 128)

According to Romero-Rodríguez and Aznar-Díaz (2018) it is a matter of time before this methodology is used habitually in the classroom, taking into account the social reality with which we meet every day. Although they affirm that we must not forget that it is another resource that the teacher has for teaching, and therefore it must be completed with other tools or techniques.

With the development of ICT and its application in the educational field we can speak of a before and after in the teaching and learning process as evidenced by experiences carried out with Google Drive and WhatsApp.

Google Drive

Currently, there are many services offered by the Internet to work collaboratively online, although, we will focus on one of the tools that have been best valued by the Centre for Learning & Performance Technologies, which annually collects the opinion of international experts in the field of education about the best tools to be used in the teaching and learning process. We are addressing Google Drive (Castellanos-Sánchez & Martínez De la Muela, 2013).

Google Drive is a service for hosting files in the cloud that allows the development of text documents, spreadsheets, presentations and surveys editable by several people who share the document (Rodrigo-Cano, Iglesias-Onofrio & Ignacio Aguaded (2015). Gómez, Palomares & Pino (2010, p.2) claim that Google Drive is a tool that facilitates "the collaborative work of the teams, groups and people who come together to share, work and learn in a virtual common space and achieve the proposed objectives". As an example, we cite some research in this regard:

Álvarez Ferrón and Sánchez Cañizares (2014) carried out an investigation with 622 students (417 women and 205 men) from the IES Prince of Asturias in Lorca (Murcia). One of the objectives of this research was to verify to

what extent the applications contained in Google Drive can facilitate cooperative work in educational centers. As a method we used a questionnaire with 20 closed questions that was developed with the Forms application included in Google Drive. The data was collected online. The results show that 100% of the students who systematically use Google Drive consider it very useful as a tool to work cooperatively, since the doubts can be solved both by the teacher and by the classmates, leading to reciprocal learning. The results show that 100% of the students who systematically use Google Drive consider it very useful as a tool to work cooperatively, since the doubts can be solved both by the teacher and by the classmates, leading to reciprocal learning. Likewise, 59.71% of the participants consider that this method of work facilitates learning and the task to be carried out, thus influencing motivation.

Morales (2015) presents an experience with 94 students (40% of students of the School of Medicine and 60% of the School of Nutrition and Dietetics) on the use of Google Drive in the subject of Computing in the Faculty of Public Health of the School Higher Polytechnic of Chimborazo (Ecuador). The most outstanding activity was to make a student portfolio. A survey was designed using the Google Drive Forms tool and was applied through email and social networks to students. According to the results obtained, 91% of respondents prefer to use the Google Drive Platform to manage the portfolio. Likewise, 92% state that this tool should be used as an institutional policy in all subjects.

Martín Roda and Sassano (2015) state that Google Drive is an easy-to-use tool with basic knowledge in computer science. It allows you to work from anywhere and with any mobile device, saving information in an authoritative way. You can share files and work with them synchronously and asynchronously, increasing the activity among the students and thus improving the teaching-learning process. These statements coincide with the results of other studies such as that of Barrios and Casadei (2014).

On the other hand, Brescó and Verdú (2014), conducted a study to assess to what extent the tools Wikispace and Google Drive can contribute to the improvement of group projects in university students. The sample consisted of 124 students of the first year of the Primary Degree of the Faculty of Educational Sciences of the University of Lleida. The students did two group projects, one carried out with the Wikispaces tool and the second with the Google Drive document tool. After this experience the students came to the conclusion that Google Drive is a better tool to carry out group projects and to encourage communication between students.

Rowe, Bozalek and Frantz (2013) developed an experiment at the Western Cape University (South Africa) with the aim of encouraging interaction between teachers and students. For this, the teachers created a learning environment using Google Drive in which the students carried out activities to develop critical thinking. The results show that Google Drive is an innovative pedagogical tool that changed the way of thinking of students.

WhatsApp

“The wide diffusion of the use of smartphones or smartphones in our country has meant the modification of some of our ways of relationship and social communication” (Diez-Ros & Aguilar-Hernández, 2016, p. 344). Currently the most used device to access the Internet is the Smartphone (88.2%), placing itself ahead of the computer (78.2%). In relation to the first is instant messaging, mainly WhatsApp (90.9% of the population, 100% among young people from 14 to 19 years old), the element most commonly used to communicate with family and friends (Telefónica, 2016. Quoted in Alonso-Ferreiro and Fraga Varela, 2016), In addition, in recent years, it has become an innovative pedagogical resource, as the following investigations demonstrate:

Padrón (2013), carried out a study with 8 participants (4 urbanists, 2 lawyers, 1 architect and 1 administrator) with ages between 25 and 44 years, to analyse to what extent the didactic strategies based on WhatsApp can promote collaborative learning, both in the formal and informal processes, in the master's degree in urban transport at the Simón Bolívar University (Venezuela). The participants created a virtual collaborative group through which they proposed how to perform the tasks, what procedures were to be used, how the work would be distributed, as well as tutorials with the teacher to resolve some doubts. The results show that the use of WhatsApp in education, integrated as a training strategy, improves communication and the construction of knowledge.

Monguillot-Hernando, González-Arévalo & Guitert-Catasús (2017) show a research carried out at the Open University of Catalonia (UOC) with 3 Physical Education teachers from different educational centre in Barcelona, with the aim of knowing how the use of WhatsApp can promote virtual collaborative work among teachers. The results obtained show the importance of the use of WhatsApp "as a synchronous and asynchronous tool to be taken into account in the monitoring of collaborative learning situations" (p.56). The faculty has advised the use of WhatsApp to other teachers making them see that it is a tool that encourages collaboration, breaks with the professional isolation that involves being in a classroom, promoting, at the same time, the relationship and

interaction between teachers.

Methodology

Type of study

The type of study developed is descriptive, applying an analysis from a qualitative approach (Colás y Buendía, 1998).

Objective

The objective of the research is to assess whether the use of Google Drive and WhatsApp favors the follow-up and development of the final Master's works, being the premises marked by the m-learning method.

Subjects

The research has focused on students who are enrolled in the Master's Degree in Teacher Training in Compulsory Secondary and Upper Secondary School Education, Vocational Training and Language Teaching in the Campus of Ceuta in the academic year 2017/2018, mainly in the Final Work of Master (TFM).

The population is composed of 6 volunteer students, where 66.6% are women and 33.4% are men. The ages of these students are between 24 and 31 years old, being 24 years old (16.6%), 25 years old (50%), 26 years old (16.6%) and 31 years old (16.6%).

The speciality that are studied in the Master are Orientation (33.3%), Spanish Language and Literature (16.6%), Mathematics (16.6%), Drawing (16.6%) and Training and Labor Orientation (16.6%).

Instrument

The interview is ad hoc, created specifically to analyse the objective set out in the research. It is of semi-structured type and consists of 6 items that try to analyze if the procedure followed is adequate or not.

The instrument, to be validated, has gone through a content validity, through the contribution of 5 expert doctors in the subject addressed. The recommendations focused mainly on the elimination of certain items, as they were not considered adequate for the aspect that was to be analyzed. The recommendations were taken into account.

Process

The information collection procedure is carried out during the development of the TFM, after two months from the beginning of the meeting in which the work to be done by each of the members was arranged, to know the situation in which they were in relation to the experience developed.

In the interview we had, a recording was made, for its subsequent transcription and analysis. The predisposition of the students was always positive and collaborative.

For the analysis of the interview, we have selected key ideas in each of the questions, with the intention of obtaining similarities or differences between the opinions.

Results

At a general level, the opinions of the students regarding the use of Google Drive and WhatsApp for the development of the Final Master's Project are positive.

In relation to the question posed on whether it has supposed to know new resources for the process of teaching and learning, the students have been unanimous in confirming it, that the fact of developing the FMP following the m-learning method has made them see the resources they usually see every day in another way.

I have always used WhatsApp for leisure and entertainment issues, and now that we have developed the training process this way, I have seen it as another pedagogical resource. I liked this new perspective [Participant 1].

It's the first time I see Drive, before I always kept the documents on a pendrive. Thanks to the development of this method of work I have observed that in addition to storage, I can modify the document anywhere and at any time, and receive modifications from the teacher without having to send and receive continuously the Word document [Participant 3].

Regarding to whether this method of teaching has contributed to learning, students have stated that, rather than

contributing to learning, it has made the task much easier.

I would say that it has helped me to perform the task more easily. I give you an example, the other day I was going away for the weekend with my family, the time that I was waiting to embark and during the passage in boat, I had the chance to consult doubts by WhatsApp and to complete the work by means of Drive [Participant 2].

To me it has facilitated the learning, as much the professor as my companions, since by means of the WhatsApp group, when I have been a doubt, they answered in a little time any of them, solving the doubts [Participant 4]

Regarding the question of whether it favors teamwork, students agreed, but in those situations when work dealt with the same topic for all of them.

It has helped me personally, especially my colleagues who had to do the Didactic Unit, because they quickly solved my doubts. In this case, we have been able to work as a team [Participant 6]

If we talk about working as a team to develop a project, I personally think not, especially in my case, that developed a Plan of Attention to Diversity and was the only one, so I have not been able to receive much advice from my colleagues. If we see it through the perspective of helping each other, I think so, because at certain times, colleagues with similar FMP lines have helped each other a lot [Participant 4].

When asked if this method matched their learning, the students said no at the beginning of the implementation, but as they progressed they observed that there would be another way to learn and that it could fit in with their new way of learning. Learnin.

I have been used to listen to the teacher in class and take notes all my life. He did not make decisions, he only copied and studied by heart. With this new form, I see that I am the one who must set my pace and guide the development of my work to my needs. Personally, I like it a lot, and I think it can be useful for my classes tomorrow [Participant 5].

Well, if we see it through the perspective of what I've lived so far, it does not fit, because I'm not used to this way of learning. If we see it through the perspective of what I just learned and put into practice, I would say that it does fit with my way of learning, because it makes my work easier and adapts to my rhythm and learning style [Participant 4].

Finally, the assessment has been very positive on the part of all students, emphasizing that this type of experience should be promoted more frequently in the university environment.

My assessment is positive. On the one hand I value the performance of the teacher who has been pending at all times to resolve the doubts about WhatsApp, and on the other hand the help received from my colleagues [Participant 6].

My assessment? Very good, the truth is that I did not know that these things could help so much academic development, in addition to offering me another type of teaching that is not masterly. I intend to apply it tomorrow. [Participant 3].

Conclusions

The students who have completed the Final Master's Project have positively evaluated the teaching and learning process that has been developed following the guidelines set by the m-learning method.

They consider that it has supposed to them to see novel teaching and learning processes through new educational resources, which has facilitated the training development, coinciding with Álvarez Ferrón and Sánchez Cañizares (2014), facilitating the completion of the various tasks and promoting group work, being in line with what was established by Gómez, Palomares and Pino (2010, p.2).

At first they had objections when developing the educational action in the manner proposed, but as the activity progressed, they saw the advantages that it entailed. They emphasize the fact that they can do their work anywhere and at any time, coinciding with what was established by Martín Roda and Sassano (2015) and Padrón (2013) as well as raising questions in the group and being answered, not only by the teacher, but for the student, which

could solve doubts adequately, generating a reciprocal learning (Álvarez Ferrón and Sánchez Cañizares, 2014).

These students believe that it would be necessary, especially in a Master oriented to teacher training, to present innovative methodologies, to facilitate both the acquisition of content and models to apply tomorrow in school coinciding with Monguillot-Hernando, González-Arévalo and Guitert-Catasús (2017) that advise the use of WhatsApp among teachers, making them see that it is a tool that encourages collaboration, breaks with the professional isolation that is being in a classroom, and it improves the relationship and interaction between teachers.

REFERENCES

- Alonso-Ferreiro, A., & Fraga Varela, F. (2016). Autopercepción de la alfabetización comunicativa en la generación Abalar (Galicia). En Roig-Vila, R. (Ed.), *Tecnología, innovación e investigación en los procesos de enseñanza-aprendizaje* (50-58). Barcelona, España: Octaedro.
- Álvarez Ferrón, M., & Sánchez Cañizares, L. (2014). Conocimiento, valoración y utilización, por parte del alumnado, de google drive como herramienta de trabajo cooperativo. *Enseñanza & Teaching*, 32(2), 23-52. Recuperado de <http://revistas.usal.es/index.php/0212-5374/article/viewFile/et20143212352/12521>
- Aznar-Díaz, I., Romero-Rodríguez, J.M., & Rodríguez-García, A.M. (2018). La tecnología móvil de Realidad Virtual en educación: una revisión del estado de la literatura científica en España. *EDMETIC, Revista de Educación Mediática y TIC*, 7(1), 256-274, doi: <https://doi.org/10.21071/edmetic.v7i1.10139>
- Barrios I., & Casadei, L. (2014). Promoviendo el Uso de Google Drive como Herramienta de Trabajo Colaborativo en la Nube para Estudiantes de Ingeniería. *Revista de Tecnología de Información y Comunicación en Educación. Eduweb*, 8(1), 43-56. Recuperado de <http://servicio.bc.uc.edu.ve/educacion/eduweb/v8n1/art03.pdf>
- Brazuelo, F., & Gallego D.J. (2014). Estado del Mobile Learning en España. *Educar em Revista*, 4, 99-128.
- Brescó Baiges, E., & Verdú Surroca, N. (2014). Valoración del uso de las herramientas colaborativas wikispaces y google drive, en la educación superior. *EduTec. Revista Electrónica de Tecnología Educativa*, 49. Recuperado de <http://www.edutec.es/revista/index.php/edutec-e/article/view/39>
- Castell, P. (2003). Televisión, videojuegos y ordenador: uso y abuso. En: GRIDOPE (eds.). *Nuevas perspectivas en pediatría extrahospitalaria*. Barcelona. Curso de Pediatría Extrahospitalaria. 285-299
- Castellanos-Sánchez, A., y Martínez De la Muela, A. (2013). Trabajo en equipo con Google Drive en la universidad online. *Innovación Educativa*, 13(63), 75-94.
- Colás, B., y Buendía, L. (1998). *Investigación Educativa*. Sevilla: Ediciones Alfar.
- Del Barrio Fernández, A., & Ruiz Fernández, I. (2014). Los adolescentes y el uso de las redes sociales. *International Journal of Developmental and Educational Psychology. INFAD Revista de Psicología*, 3(1), 571-576.
- Díez-Ros, R., & Aguilar Hernández, B.M. (2016). Los grupos de WhatsApp escolares: una oportunidad para mejorar la comunicación familia-escuela. En Roig-Vila, R. (Ed.), *Tecnología, innovación e investigación en los procesos de enseñanza-aprendizaje* (343-351). Barcelona, España: Octaedro.
- Fundación Telefónica (2016). *La Sociedad de la Información en España 2015*. Fundación Telefónica
- Gómez, C., Palomares, R. y Pino, J. (2010). La utilización de herramientas colaborativas 2.0 en el ámbito de la documentación publicitaria. *DIM*, 18. Recuperado de <https://dl.dropboxusercontent.com/u/20875810/dim/revistaDIM18/revista18publicitaria.htm>
- Leiva-Olivencia, Moreno-Martínez & Peñalva (2016). El papel de las TIC en el desarrollo de la ciudadanía intercultural a través de la creación de comunidades virtuales para la digiculturalidad. En Roig-Vila, R. (Ed.), *Tecnología, innovación e investigación en los procesos de enseñanza-aprendizaje* (772-784). Barcelona, España: Octaedro.
- Martín Roda, E., & Sassano Luiz, S. (2015). Posibilidades de google drive para la docencia a distancia y en el aula. *Didáctica Geográfica*, 16, 203-220. Recuperado de <http://www.age-geografia.es/didacticageografica/index.php/didacticageografica/article/view/302>
- Monguillot-Hernando, M., González-Arévalo, C., y Guitert-Catasús, M. (2017). el WhatsApp como herramienta para la colaboración docente. *EmásF, Revista Digital de Educación Física*, 8(44), 56-62.
- Morales, E. R. (2015). Una experiencia personal: Google Drive para el portafolio virtual docente-estudiante en la docencia universitaria. *Revista Tecnológica-ESPOL*, 28(2). Recuperado de <http://www.rte.espol.edu.ec/index.php/tecnologica/article/view/315>

- Padrón, C.J. (2013). Estrategias Didácticas basada en Aplicaciones de Mensajería Instantánea WHATSAPP exclusivamente para Móviles (Mobile Learning) y el uso de la Herramienta para promover el Aprendizaje Colaborativo. *Revista de Tecnología de Información y Comunicación en Educación*, 7(2), 123-134.
- Raposo-Rivas, M., & Salgado-Rodríguez, A.B. (2015). Estudio sobre la intervención con Software educativo en un caso de TDAH. *Revista nacional e internacional de educación inclusiva*, 8(2), 1889-4208.
- Rodrigo-Cano, D., Iglesias-Onofrio, M., y Aguaded, I. (2015). Metodologías participativas en la nube: la “g-Google” vs. La “Generación X” en la Web 2.0. *Revista complutense de educación* 28(1), 223-237.
- Romero Rodríguez, J.M., & Aznar Díaz, I. (2018). Caminando hacia una ciudadanía digital: la atención a la diversidad desde un enfoque de mobile learning. En XV Congreso Internacional y XXXV Jornadas de Universidades y Educación Inclusiva (695-702). Granada, España: Editorial Universidad de Granada.
- Rowe, M., Bozalek, V., & Frantz, J. (2013). Using Google Drive to facilitate a blended approach to authentic learning. *British Journal of Educational Technology*, 44(4), 594-606.

Use Of Mobile Learning For The Application Of A Multidisciplinary Program In Health: The Case Of The Beatriz De Silva School

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Abstract

The use of mobile learning is justified in the relevance of learning today through resources and electronic devices, pursuing autonomy, portability, adaptation and learning innovation. Thus, the purpose of this paper is the study of the application of a methodology based on mobile learning to develop a program of healthy contents, from the perspective of the different areas that make up the curriculum in Spain. Specifically, this study was conducted at the Beatriz de Silva School in the educational stages of preschool, primary and secondary with the objective of promoting the styles and habits of healthy living with new technologies. In addition, as the awareness to reduce, the high index of sedentary and health problems derived from the scarce physical activity and bad eating habits. To carry out this study, we opted for the use of a quantitative research methodology, based on the statistical study of the data collected through an ad hoc questionnaire. The most significant results reflect a high degree of student motivation for learning through digital resources and certain deficiencies to develop a healthy lifestyle. In summary with this teaching methodology, the student becomes the main actor of their own learning, being able to manage their own process and evolution of it.

Keywords: *Mobile learning, innovation, ICT, health, children population.*

Introduction

ICT have come to society to simplify everyday tasks and make life easier, but to a certain extent they are affecting and complicating other fundamental aspects such as health (Echeburúa, & De Corral, 2010).

At the educational level, ICT are considered as tools that offer great possibilities, but in the field of health, they are not so well positioned, because they are closely related as one of the great causes of sedentary lifestyle, causing even problems arising in the academic performance (Puig, Llamas, & Portolés, 2015).

It is necessary that students in the early stages of education become aware of good healthy habits. The educational centres acquire a relevant role towards the promotion of an active life, promoting sports and physical activity as the best possible medicine for cardiovascular diseases. Also important in this promotion of healthy styles is the involvement and collaboration of families, as a prominent pillar within the Educational Community, giving rise to a triangulation of the teaching and learning process among teachers-students-families (Macías, Gordillo, & Camacho, 2012).

The absence of physical activity in today's society causes one of the greatest dangers, increasing the possibility of suffering from cardiovascular diseases, obesity or diabetes, among others. It is worrisome the amount of hours that young people today spend in front of new technologies, conditioning the time of physical activity or leisure and recreation games with people in their environment (Beltrán, 2011).

The adolescent population uses ICT in an abusive manner, devoting much of their free time to escape and interact with their peers through social networks and the Internet. This scenario leads to an increase in the rate of sedentary lifestyle, inactivity, even affecting even the eating habits, leading to changes in diet, promoting fast food, as a result of technological interaction (Pérez, Quiroga, Olivares, & Pérez, 2017).

Any action or activity carried out without control can cause an addiction and that is what is happening with new technologies in the hands of the youngest, as more active users who neglect other fundamental aspects such as health (Echeburúa, & De Corral, 2010). It is important to know the main sedentary behaviour of people in order to establish the best strategies to combat it and its problems derived (Cantalops et al., 2012).

In developed countries is where there is greater overweight and obesity. About 30% of the child population suffers from this type of problems, evidenced by the decrease in physical activity due to technological incidence, leading to future serious problems related to health (San Mauro et al, 2015).

For González, Gómez and Navarro (2016), obesity has become the great epidemic of the new century, being one of the causes of death in the world. In Spain, obesity is suffered by 62% of the population. Obesity has been increasing in recent years due to the change in life that has led to technological influence.

Following Fonseca, Maldonado, Pardo and Soto (2007), in their studies they allude to one of the recommendations of the World Health Organization (WHO), such as the promotion of active and healthy habits and lifestyles to prevent diseases. In order to lead a healthy life and prevent the risks caused by physical inactivity, it is essential to make humanity aware of the critical use of technology that surrounds us and indirectly affects our health, due to

the change in the way of living, working and interacting with the environment and the people around us (De Diego, Fernández, & Badanta, 2017).

According to Beltrán (2011), although it seems a contradiction, the use of ICT and videogames has been used to counteract the sedentary lifestyle and the passivity that has caused technological development in our society. In an era marked by the incidence and rapid technological expansion, in order to achieve an active and healthy lifestyle, we must trust in the potential of ICT and develop strategies and actions that result in a digital and active practice of activities focused on promoting of the health.

Today's education is conceived as a search towards the active learning of the learner, based on discovery and from different perspectives, all of this at the hand of technology, allowing to make more motivating and attractive activities and resources for students. That is why the development of technological equipment in schools has been increased and improved in recent years, as a result of the integration of ICT in our lives (Chacón et al., 2016).

Following the studies of Mora (2013), mobile learning or mobile learning has been favoured by the development of technologies in today's society. It is conceived as a new methodology focused on mobility, communication, learning in different contexts and the collaboration of students to carry out tasks or solve problems, in an active and participatory way, through mobile devices. Authors such as Moreno, Leiva and Matas (2016), consider mobile learning as an emerging methodology with a high incidence in education. Romero, Rodríguez-García and Aznar (2017), understand it as new environments that offer students great possibilities to develop knowledge, have a great source of resources as well as the promotion of digital competence and collaborative work. For Brazuelo and Gallego (2014), one of the characteristics of mobile learning is ubiquity, which means that at any time and place the learner can get in touch with the contents and build their own learning.

That is why we must resort to technology and take advantage of its potential to motivate and increase the practice of physical activity, in addition to the respect and care of our body (González, Gómez, & Navarro, 2016), being mobile learning an ideal methodology to achieve it .

The Study

Context

This research has been carried out in a very particular geographical setting such as the Autonomous City of Ceuta, a Spanish city located in the North of the African continent, separated from the Iberian Peninsula by the Strait of Gibraltar. Ceuta presents the peculiarity of being a multicultural city, in which 4 cultures coexist peacefully, such as Christian, Muslim, Hebrew and Hindu.

Specifically, this study has been carried out in an educational centre of the city, specifically in the Beatriz de Silva School, which acts as a teaching cooperative. This centre is located in the downtown area of the city, encompassing a population of students whose families have an average socioeconomic power.

The Beatriz de Silva School covers an approximate number of 700 students, divided into the first 3 educational stages proposed by the law in education, such as the preschool, primary and secondary stage, in turn each course has two educational lines. The teaching faculty that composes this teaching cooperative is composed of 40 education professionals. Table 1 shows the distribution of students and teachers in each educational stage.

Table 1: Demographic characteristics of the educational centre.

Educational stage	Teachers	Students
Preschool Education	10	150
Primary Education	17	340
Secondary Education	13	210

Source: Self-made.

Objectives

This research is based on the idea of applying a healthy program in the school population by means of two methodologies, a mobile learning and a traditional one.

From this main purpose derive the following specific objectives to finalize the study:

- To know the habits and lifestyles of the students of the Beatriz de Silva educational centre.
- To raise awareness in the educational community about the importance of following healthy habits.
- To know the deficiencies that students have in the field of health.
- To check the scope and effectiveness of each methodology used.

Methods

To carry out this study, we chose the choice of a quantitative method, focused on the statistical study of the data obtained. At the same time, several descriptive and correlative analyses have been carried out to better approximate and understand the current reality found in the educational centre in question.

Sample

The subjects that participated in this research covered a figure of 300 students, selecting 100 participants from each stage, following a simple random sampling. The resulting sample remaining as shown in table 2.

Table 2: Sample of participants.

Educational stage	Students
Preschool Education	100
Primary Education	100
Secondary Education	100

Source: Self-made.

Instrument

The measuring instrument used to carry out the information collection process has been the questionnaire. In particular, an ad hoc questionnaire has been prepared for this research, created specifically to meet the requirements of this study, covering various dimensions that allow obtaining the necessary results to fulfill the purposes of this study.

The questionnaire consists of 35 items divided into 4 dimensions as shown in table 3.

Table 3: Dimensions of the questionnaire.

Dimensions	Variables
Sociodemographic	6
Healthy habits	12
Harmful habits	12
Methodology used	5

Source: Self-made.

The items presented by this instrument have been drawn up in their vast majority to be answered following a Likert rating scale, between the values 1-4, with 1 being the lowest value and 4 being the highest.

To know the reliability and validity of the questionnaire, this has been submitted to evaluation by an expert judgment composed of 4 PhD of the University of Granada, who evaluated the instrument in a positive way. On the other hand, to know the reliability of it, the Cronbach's Alpha test was applied, reaching the values shown in Table 4.

Table 4: Cronbach's alpha.

Dimensions	Results
Sociodemographic	0,867
Healthy habits	0,859
Harmful habits	0,842
Methodology used	0,851

Source: Self-made.

These results obtained by applying the Cronbach's Alpha demonstrate a high internal consistency index in the different items that make up the questionnaire, giving rise to a fairly reliable instrument to develop such research.

Process

In order for the research process to be carried out satisfactorily, a plan was drawn up that covered each and every one of the phases that have been carried out during the course of the study.

In particular, the research was developed in 5 different stages, marked in a schedule of action so that each action was carried out effectively, not altering or conditioning the evolution of the study in question.

The first stage integrates all those actions that give origin and life to this investigation, such as the realization of documents and formal writings to obtain the authorization and necessary permits to carry out the study in an educational centre. Table 5 lists all the documents prepared for such purposes.

Table 5: Authorizations and necessary permits.

Issuance of requests to:	State
Management team of the educational center	Permission granted
Provincial Delegation of the Ministry of Education, Culture and Sports	
Ministry of Education	
Families of the students	

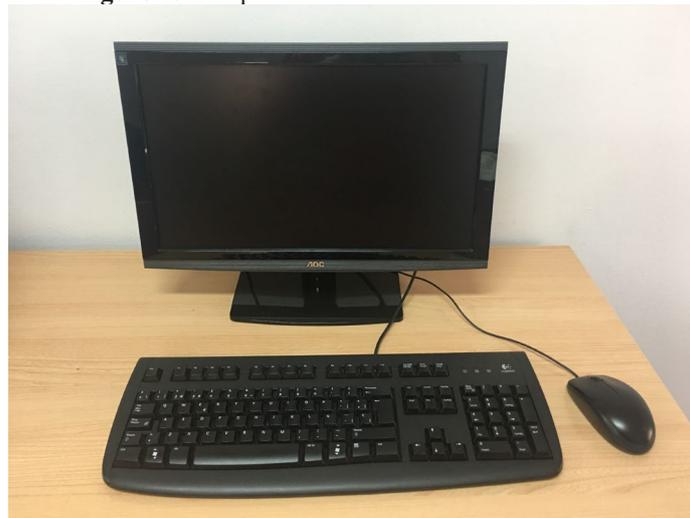
Source: Self-made.

These writings were made and sent digitally, through the official email of each institution. After several days, the positive responses of each of these organisms were obtained, not receiving any problem to carry out the research.

In the second stage, in order to grant officialise, formality and commitment on the part of researchers to the research, each institution involved and mentioned above was visited personally, explaining in situ the purposes and purposes of the study.

The third stage encompassed the realization of a schedule where dates and hours were established to collect the data, this planning was carried out jointly with the members of the School Management Team, establishing a schedule that did not disturb the normal course of the day school. Once the planning was done, a pre-test was carried out to obtain an initial assessment and mark the starting point. In order to promote the use of ICT, to preserve and educate the students about the respect and care of the environment and to obtain an increase in the motivation of the study participants when filling out the questionnaire, it was carried out through of "all in one" model computers donated by the educational centre, as shown in figure 1.

Figure 1: Computer model used for data collection.



Source: Self-made.

In the fourth stage, the previously planned 4-month application of a teaching methodology based on mobile learning was produced, but only in certain groups of students, from an autonomous, participatory, social, communicative, portable and in new environments of learning, thanks to the use of said methodology, through devices such as the one shown in figure 2.

Figure 2: Mobile device used for mobile learning.



Source: Self-made.

The rest of the students remain under a traditional teaching methodology, covering the development of various contents related to healthy habits and lifestyles, as shown in the following table 6.

Table 6: Developed contents.

Physical activity
Alimentation
Postural hygiene
Corporal hygiene
Control of ICT

Source: Self-made.

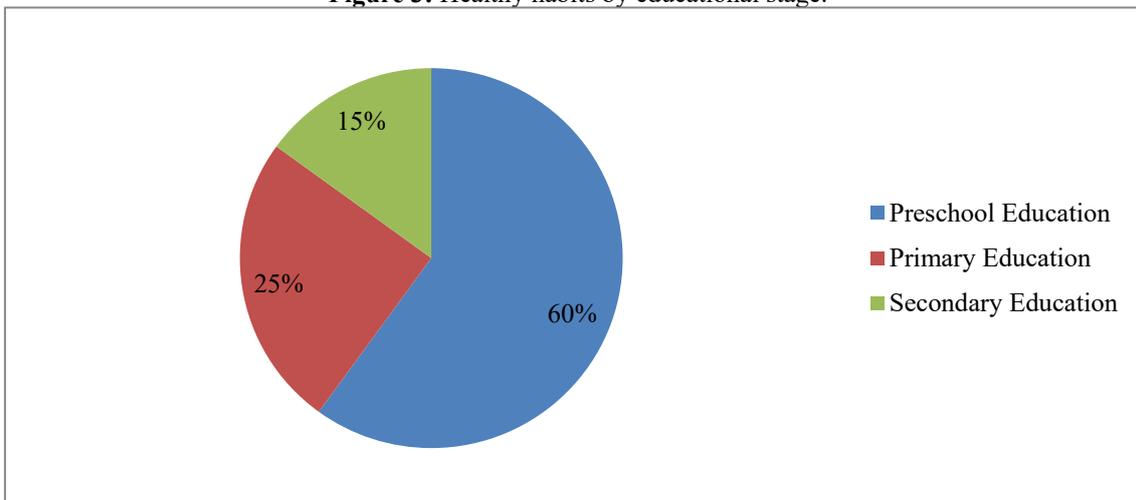
In the fifth and final stage, the second data collection process was carried out that allowed to compare the data obtained initially with those obtained after the application of a program of contents related to health.

Findings

After the statistical analysis of the different variables that make up this research, the most relevant results obtained after the quantitative study are presented below.

As shown in figure 3, after analysing the data collected from both teaching methods, it is determined that the educational stage that follows healthier living habits than the rest is Preschool Education, with 60% of the subjects who follow such healthy styles, followed by 25% of students belonging to the stage of Primary Education, until reaching a lower 15% of the sample that represents the students of more advanced ages, corresponding to the stage of Secondary Education, who follow some habits of healthy life to a lesser extent than the rest.

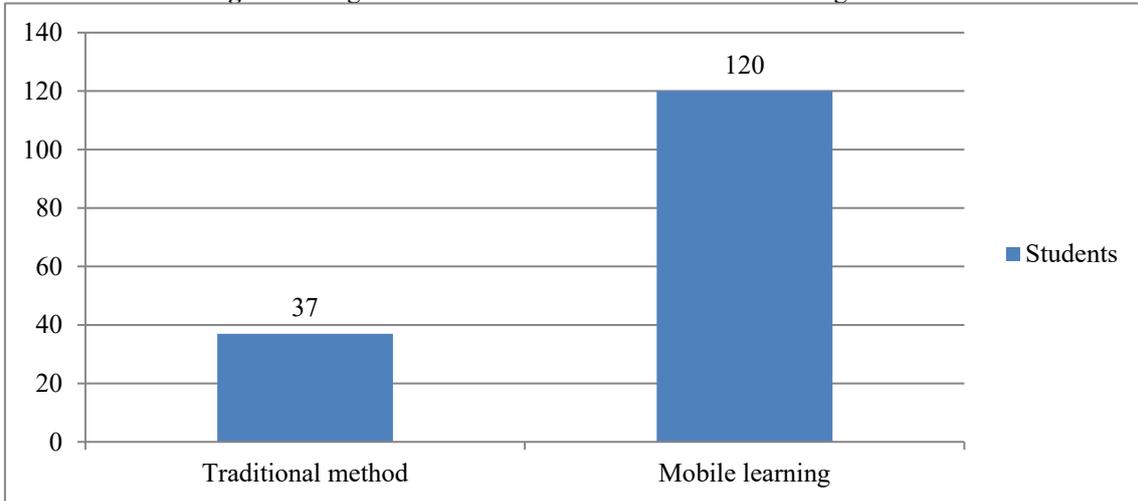
Figure 3: Healthy habits by educational stage.



Source: Self-made.

Of the two teaching methods applied in this research, as reflected in figure 4, those students who have developed the contents related to health from a digital and innovative perspective through mobile learning, have expressed greater predisposition and motivation in the accomplishment of the learning tasks. It is worth noting the overwhelming difference between the two methodologies, highlighting the dynamising supremacy of mobile learning that has managed to motivate a total of 120 students, compared to the traditional one that has only promoted 37 students.

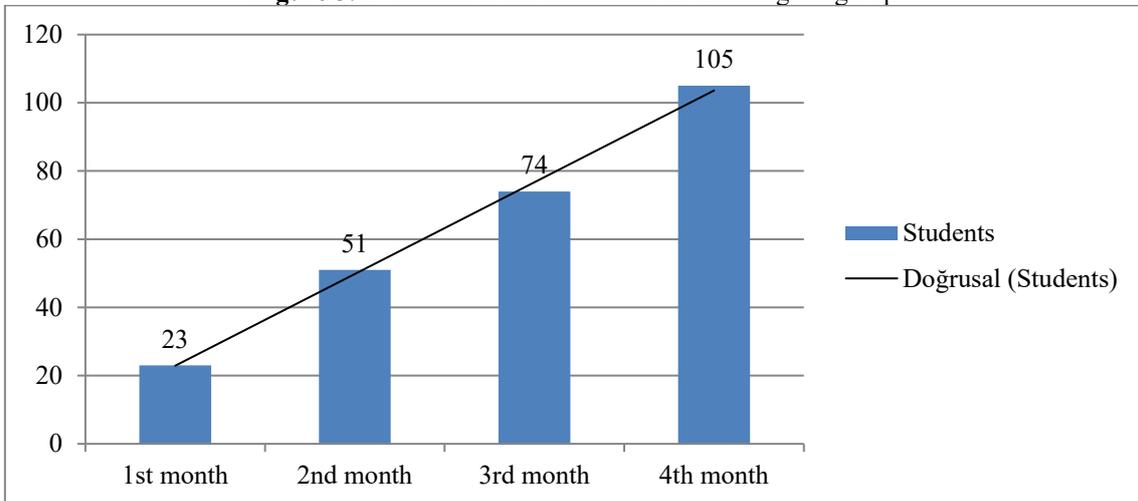
Figure 4: Degree of motivation achieved at the methodological level.



Source: Self-made.

As shown in figure 5, the evolution of students in the acquisition of healthy habits in a range of 4 months, is notable for its increasing character, increasing each month the number of students who have consolidated an active and healthy life, arriving to the figure of 105 students in the 4th month of study.

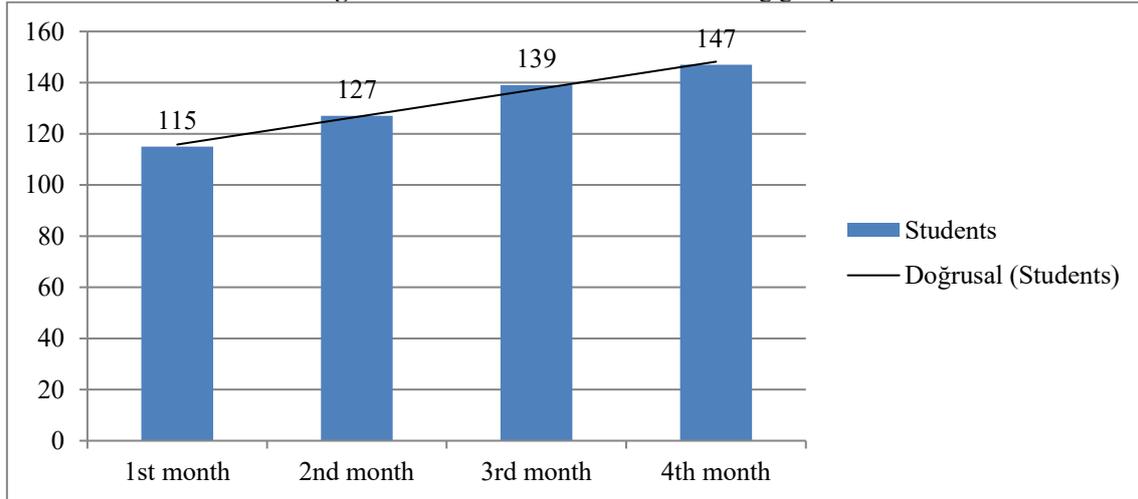
Figure 5: Evolution of the traditional methodological group.



Source: Self-made.

Therefore, figure 6 shows the evolution of the group that has developed an innovative methodology, focused on the use of mobile devices, which show a less pronounced growth between each month, but the number of students that have improved they have learned and implanted in their lives the healthy lifestyles developed in the contents taught.

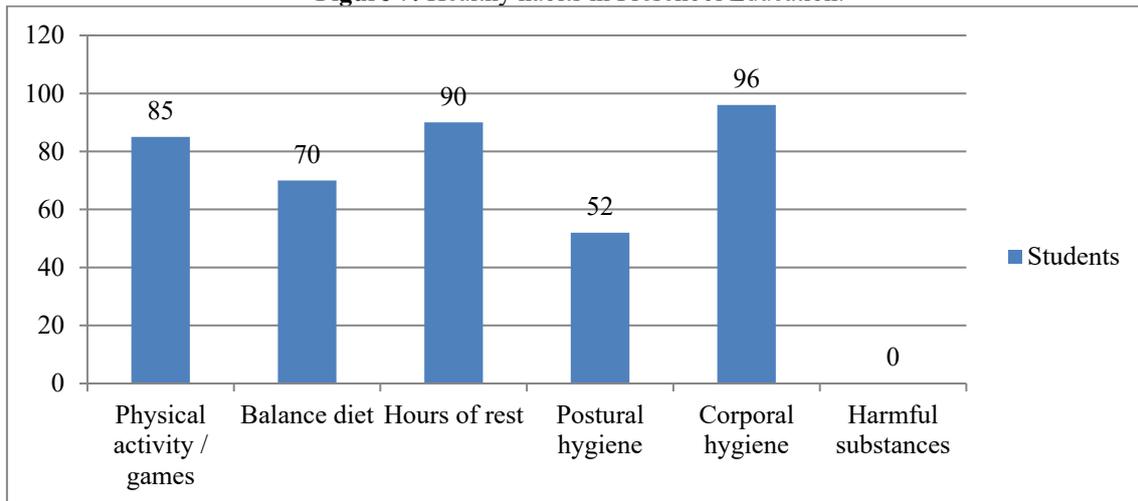
Figure 6: Evolution of the mobile learning group.



Source: Self-made.

In the stage of Preschool Education, as reflected in figure 7, there are peaks in each of the items related to healthy life, with a lower number of 52 students not following appropriate postural hygiene, which may lead to a future problems related to the child's health and normal development and growth.

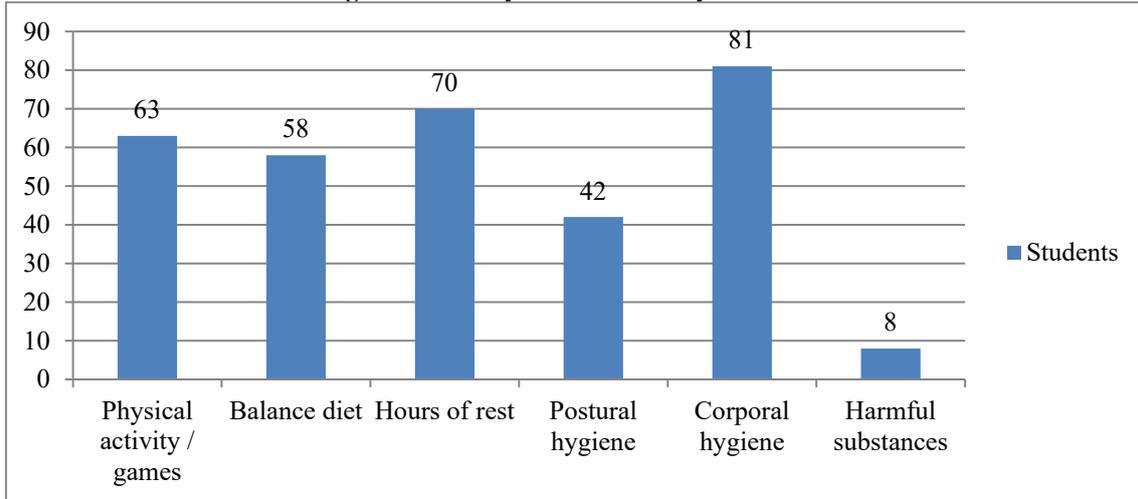
Figure 7: Healthy habits in Preschool Education.



Source: Self-made.

Regarding the Primary Education stage, figure 8 shows that the data obtained are still high, although in a smaller proportion than the previous educational stage. The figure related to postural hygiene is still in decline, highlighting the beginning of the consumption of substances harmful to health.

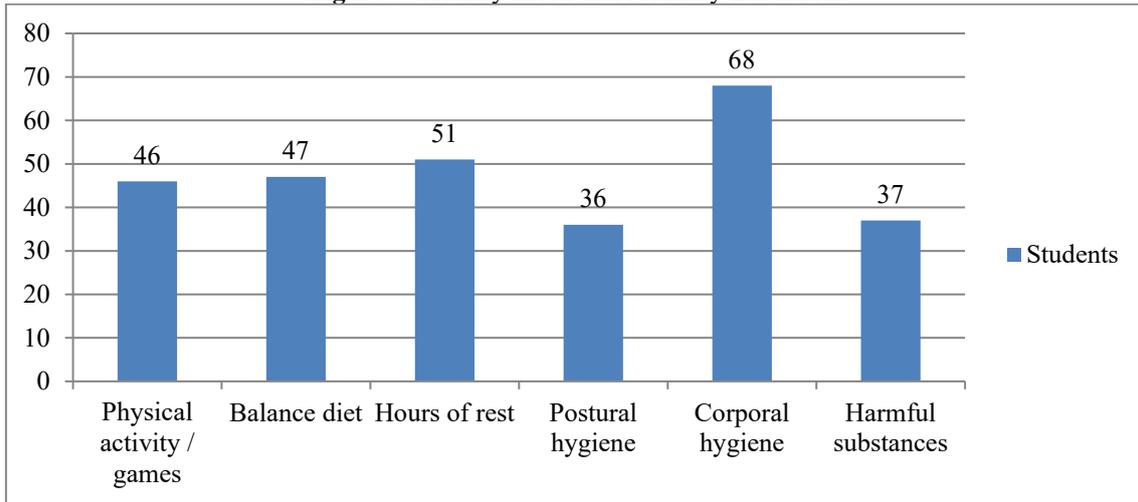
Figure 8: Healthy habits in Primary Education.



Source: Self-made.

In figure 9, the results are more worrying, with a decrease in all the items, except the one related to the consumption of harmful substances that, as happened in the previous stage, as the student grows, this increases the consumption of harmful products to health.

Figure 9: Healthy habits in Secondary Education.



Source: Self-made.

Conclusions

After carrying out this research, significant and relevant information has been obtained about the reality of health in an educational centre. The results achieved have allowed us to clarify that the first two educational stages (Preschool and Primary Education) are those with the highest levels of healthy life, but it is from the Secondary Education stage, that is, in adolescence, when a Considered descent of healthy habits and styles in the students.

At the methodological level, the use of a methodology based on mobile learning has led to greater motivation, participation and enthusiasm in the learning process of students, thus increasing the incidence of the healthy content program, compared to the traditional method, which only has promoted a few groups of schoolchildren.

With respect to the evolution in the improvement and transformation of the attitude of the students towards an active and healthy life, in a period of 4 months, the mobile learning method has managed to capture and modify the behaviour of a greater number of students. In this short period of time, the students has worked, understood and assimilated the importance and need to follow some guidelines and recommendations to have a good state of health.

Therefore, it is concluded that this innovative method used in an educational centre for the promotion of healthy

habits and styles, through the application of a healthy content program through mobile devices, has been positive and enriching for the students, same time that has served for the promotion of the TIC and the work of the digital competence of the students for a healthy end in a transversal way.

References

- Beltrán, J.I. (2011). Active video games, conventional video games and physical activity in high school teenagers. *Espiral. Cuadernos del profesorado*, 4(7), 23-27.
- Brazuelo, F., & Gallego, D. (2014). State of Mobile Learning in Spain. *Educar em Revista*, 4, 99-128.
- Cantallops, J., Ponseti, F.J., Vidal, J., Borràs, P.A., & Palou, P. (2012). Adolescence, physical inactivity and overweight: analysis based on socio-personal variables of the parents and the type of sport practiced by the children. *Retos. Nuevas tendencias en Educación Física, Deporte y Recreación*, 21, 5-8.
- Chacón, R., Castro, M., Zurita, F., Espejo, T., & Martínez, A. (2016). Active video games as an ICT resource in the Physical Education classroom: study based on digital leisure parameters. *Digital Education Review*, 29, 112-123.
- De Diego, R., Fernández, E., & Badanta, B. (2017). Use of ICT to promote healthy lifestyles in children and adolescents: the case of overweight. *Revista Española de Comunicación en Salud (RECS)*, 8(1), 79-91.
- Echeburúa, E., & De Corral, P. (2010). Addiction to new technologies and social networks in young people: a new challenge. *Adicciones*, 22(2), 91-95.
- Fonseca, M. E., Maldonado, A., Pardo, L., & Soto, M. F. (2007). Adolescence, lifestyles and promotion of healthy habits in the school setting. *Umbral científico*, 11, 44-57.
- González, C. S., Gómez, N., & Navarro, V. (2016). Educational intervention program for the treatment of childhood obesity based on active videogames. *Revista da FAEEBA-Educação e Contemporaneidade*, 25(47), 155-172.
- Macías, A. I., Gordillo, L. G., & Camacho, E. J. (2012). Eating habits of school-age children and the role of health education. *Revista chilena de nutrición*, 39(3), 40-43.
- Mora, F. (2013). Mobile learning and some of its benefits. *Revista Electrónica Calidad en la Educación Superior*, 4(1), 47-67.
- Moreno, N.M., Leiva, J.J., & Matas, A. (2016). Mobile learning, Gamification and Augmented Reality for language teaching-learning. *IJERI: International Journal of Educational Research and Innovation*, (6), 16-34.
- Pérez, M. J., Quiroga, A. B., Olivares, P., & Pérez, J. (2017). Abusive use of Information and Communication Technologies: intervention experience in Addiction Prevention in San Luis. *Virtualidad, Educación y Ciencia*, 8(14), 182-188.
- Puig, B., Llamas, F., & Portolés, A. (2015). Relationship between information and communications technology with the academic and practicing physical activity in Primary Education. *Didáctica, innovación y multimedia*, 32, 1-10.
- Romero, J.M., Rodríguez-García, A.M. & Aznar, I. (2017). Una aproximación al establecimiento de indicadores de calidad para la evaluación de buenas prácticas docentes en mobile learning. En J. Ruiz-Palmero., J. Sánchez-Rodríguez y E. Sánchez-Rivas (Eds.), *Innovación docente y uso de las TIC en educación* (pp. 1-9). Málaga, Spain: UMA Editorial.
- San Mauro, I., Megías, A., García, B., Bodega, P., Rodríguez, P., Grande, G., Micó, V., Romero, E., García, N., Fajardo, D., & Garicano, E. (2015). Influence of healthy habits in the weight status of children and adolescents of school age. *Nutrición Hospitalaria*, 31(5), 1996-2005.

Use Of Web 2.0 Tools Running A Wiki For Contents Creation Through Cooperative Groups

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Abstract

Web 2.0 has generated a change in people's attitudes ranging from static to dynamic thanks to the web tools that allow users to share, collaborate and participate, generating contents in a cooperative way. This research aims to identify whether the Wiki tool is suitable for contents creation, both theoretical and practical, following the philosophy of cooperative groups, in students enrolled in the Master's Degree in Teacher Training in Compulsory Secondary and Upper Secondary School Education, Vocational Training and Language Teaching in the Campus of Ceuta (n = 73). The method is descriptive and correlational, carrying out an analysis from a mixed approach (quantitative and qualitative). Two instruments were created to obtain the data: a questionnaire to evaluate the Wiki application as a valid tool for the teaching-learning process (post); and a debate outline for the discussion groups consisting of eight groups of 8 members, except one formed by 9. The quantitative results showed the application favoured the class group participation, the inquiry, collaboration and learning and in fact it offers new perspectives for the teaching process. The lack of time to properly develop the activity stands out as a negative aspect. At a qualitative level the results showed that students were reluctant to apply a new educational methodology, but as the classes progressed, they valued the action positively, considering the possibility of applying them when they were teachers. As an improvement proposal they suggested to create smaller groups to produce contents through the Wiki. We can conclude the Wiki application can be a valid tool for contents creation, as long as it is applied in smaller groups.

Introduction

There is no consensus when it comes to establishing the moment of the birth of the Web 2.0 term, for some authors (De Haro, 2010), the term was first coined by Dacy Dinucci to indicate the changes that were taking place at an aesthetic and design level various websites. For others (Martín, 2011, Palomo, Ruiz & Sánchez, 2008), the term appears in the mouths of Tim O'Reilly and Dale Dougherty, in 2004, referring to user communities, which could modify various applications thanks to the social collaboration.

It is in 2006, when the term Web 2.0, from Time magazine, which publishes it on its cover, reaches its peak. In this magazine reference is made to the paradigm shift of the web, which goes from being a content website to a web of people (Castellanos, et al., 2011).

When we define Web 2.0 we should consider two aspects. On the one hand, we can consider it as a series of tools that allow network members to share, collaborate and participate in the different contents that are generated in different Web (Chernoll, 2009; Casamayor, 2008); or, as a social philosophy, focused on the attitude of people, where webs, previously static, become dynamic due to the contributions of the community (Unturbe and Arenas, 2010, Zamarrazo and Amorós, 2011).

If something characterizes Web 2.0, it is because it is interactive (Zamarro and Amorós, 2011), dynamic, open (Unturbe and Arenas, 2010), collaborative, participative (De Haro, 2010), intuitive, simple (Castellanos, et al., 2011), modifiable (Martin, 2011) and free (Palomo, Ruiz and Sánchez, 2008). All these aspects make that the use of Web 2.0 has generated so much expectation and caused so much use by the community that accesses the Internet. At an educational level, the introduction of Web 2.0 in the teaching and learning processes have caused changes in the role of teachers and students. Teachers become guides of training, while students are responsible for their learning, marking the actions that really motivate them in their learning (Cela et al., 2010).

In addition, it generates new methods and learning styles (Dominguez and Llorente, 2009), being an example, the possibility of creating online spaces with large amounts of information sources thanks to the contribution of both teachers and students (Marqués, 2007).

The emergence of Web 2.0 implied the development of new resources, including the Wiki application, considered one of the most well known academic tools among the 2.0 (Barberá, 2009), which modified the way to obtain information, since it does not stay only in the reception of it, but you can modify it and edit it according to your

knowledge, favoring collective learning (Araujo, 2017).

The term wiki is based on the term "wikiwiki", which is Hawaiian, and refers to speed or informality (Villaroel, 2007; Mora, 2012; Sanz, Gil and Marzal, 2007). The first wiki was created by Cunningham in 1995 with the intention of sharing non-profit knowledge, being the impulse of new wiki with the same philosophy (Mur, 2015). We can define it as an instrument of collective participation and construction of knowledge, formed by tools for publication, shared editing and analysis of hypertext documents that allows users to access, through a web browser, create, edit, delete or modify a certain text, quickly, Interactive and simple, without having to do it in the same physical and temporal space, in a shared digital space, asynchronously (Gómez and Álvarez, 2011, Espinosa, 2014, Giménez and González, 2009, Vela, Medina and Rodríguez, 2017; Mora, 2012). This tool offers, for both formal and informal education, collaboration and mutual commitment to learning (Barberá, 2009).

When evaluating Wikis, they offer many advantages that make it a powerful tool for the social field and for the educational field. Wikis allows you to include many digital add-ons, users can edit and develop content, favors collaboration (Araujo, 2017, Giménez and González, 2009, Mur, 2015), offers temporal and spatial flexibility, allows you to work asynchronously or synchronously, they can be private or semi-private (Gómez and Álvarez, 2011; Giménez and González, 2009; Villaroel, 2007), freeze a document when it is finalized (Concepción, 2008), it is accessible, intuitive and friendly (Mora, 2012); favors the attention to diversity, controlled learning environments, allows to follow the whole process of elaboration (Espinosa, 2014; Giménez and González, 2009), retrieves information quickly and easily (García, 2016), offers a variety of templates for his creation; allows to manage permissions at user and page level; is free; does not require complex computer skills (Mora, 2012); it is flexible; improves the interaction between pairs and favors the involvement in learning (Vela, Medina and Rodríguez, 2017).

Although, as in all the resources that we can find, they also have disadvantages, which we must know to minimize their effect as much as possible. What we can find is the difficulty of evaluating individual work (Araujo, 2017); the contents presented can not be directly contrasted; depends on the internet connection; the modifications made do not ensure that they are of better quality (Giménez and González, 2009); Teachers may not know how to give enough support to encourage participation (Gómez, 2017); loss of information, either by mistake or by malpractice, in the modifications made by users (Mora, 2012); the lack of motivation can damage its didactic application (Vela, Medina and Rodríguez, 2017).

At an educational level, and focusing on the perspective of the students, those who have developed the digital competence, are those who value the resource positively and see useful purpose. On the other hand, those who have not developed it, value it negatively, and do not see functionality in their daily work (Giménez and González, 2009).

It is important that students have a participatory spirit, and are themselves responsible for their learning, in a coordinated manner, as this will allow for better results in the use of the Wiki resource (Sanz, Gil and Marzal, 2007).

At a methodological level, the Wiki favors and enhances collaborative work (Gómez and Álvarez, 2011), allowing both teachers and students to work closely and jointly on a specific topic, although it must be accompanied by a clear objective. This collaborative learning requires coordination, commitment and effort on the part of all the members of a group (Araujo, 2017; Mora, 2012), as well as establishing the problem to be addressed and providing solutions among all (Barberá, 2009), planning in detail all the actions to be developed (Giménez and González, 2009).

If we want its use for the teaching and learning process to be successful, we must contextualize the activity, determine the objectives, establish the work plan, select the human and technical resources, indicate the evaluation system (Giménez and González, 2009). This fact should be applicable to any educational action that is developed, its use not being exclusive for the Wiki resource.

The student must be an active part of the teaching and learning process (Mora, 2012), generating skills at the negotiation level, to jointly generate knowledge (Gómez, 2017), while the teacher must become a guide and guidance of learning, positioning itself within the constructivist paradigm (Vela, Medina and Rodríguez, 2017; Mora, 2012), offering an alternative to the resources used in the traditional methodology (Gómez and Álvarez, 2011). Moving from being a classic tutor to an e-tutor (Mur, 2015).

Before starting to use it, we must train students in its use, especially in basic operations, to familiarize with the tool (Araujo, 2017), either through practical explanation or tutorial (Espinosa, 2014), thus avoiding demotivation due to lack of knowledge in its management.

When evaluating the academic development of students through the Wiki resource, it can be developed in various ways, either through self-assessments or co-evaluations (Gómez and Álvarez, 2011), or any evaluation procedure or technique. The important thing is to have planned the development of the activity, in addition to establishing clear qualification criteria on the final grade of the subject in which we are developing (Giménez and González, 2009). In addition, it is necessary to monitor the activity of the students on a constant basis (Gómez, 2017), so that they are aware that their work is being valued.

The use of the Wiki resource is ideal for teaching the writing process, as it promotes reflection, review, publication and observation of the results, becoming an interactive writing book (Araujo, 2017).

Methodology

Type of study

The study we have developed is descriptive and correlational, applying data analysis from a quantitative and qualitative approach (Colás and Buendía, 1998).

Objective

The objective of this research is to identify if the Wiki tool is suitable for the creation of contents, both theoretical and practical, following the philosophy of the cooperative groups, in the students enrolled in the Master's Degree in Compulsory Secondary Education, Baccalaureate, Vocational Training and Language Teaching in the Campus of Ceuta.

Subjects

For the research we have selected the entire population that form the student body enrolled in the Master of Training in Teaching Compulsory Secondary Education, Baccalaureate, Vocational Training and Language Teaching in the Campus of Ceuta in the academic year 2017/2018 in the subject of Educational Processes and Contexts.

The population is made up of 73 subjects, where there are more women (45.2%) than men (54.8%), where the students have an age range between 21 and 25 years (52.1%) mainly, followed by the interval between 26 and 30 years old (30.1%). There are also, but in a better proportion, students aged between 31 and 35 years old (9.6%) and over 35 years old (8.2%).

The specialties with which they are studying the Master are mainly Training and Labor Guidance (13.7%), Economy (13.7%) and Foreign Language (13.7%), followed by Educational Guidance (9.6%), Sanitary Processes (8.2%), Mathematics (8.2%), Biology and Geology (6.8%), Social Sciences (6.8%), Drawing (6.8%), Spanish Language and Literature (4, 2%), Physics and Chemistry (4.2%), ICT (2.7%) and Physical Education (1.4%).

The religion professed by the student enrolled is mainly the Christian religion (49.3%), followed by the Muslim religion (12.3%) and another, in which students have placed Buddhism (4.1%). There is a high percentage that does not follow any religion (34.2%).

Instrument

The questionnaire prepared is ad hoc, created specifically to analyse the objective set out in the investigation. The instrument consists of 9 items, distributed in a field, called "Use of the Wiki application in the teaching and learning process", composed of 5 items, in addition to sociodemographic data, formed by the items sex, age, specialty and religion who professes.

In order to be validated, the instrument has gone through a validity of content, through the contribution of 5 doctors, experts in the subject treated. The recommendations focused mainly on the modification of the wording of certain items, aspects that we took into account.

For reliability, we apply the coefficient of internal consistency of Cronbach's Alpha, through a pilot test applied to 35 trained during the 2016/2017 academic year. The average value of Cronbach's Alpha is 0.768; considered to be acceptable to be higher than 0.70 (George and Mallery, 2003).

The script was prepared ad hoc, composed of 3 questions, focused on the evaluation of experience, positive and negative aspects found and proposals for improvement in their application within the teaching and learning process.

The instrument was subjected to content validity by the same experts as in the questionnaire, who recommended grouping items, and modifying the approach to certain issues, which we had in mind.

Process

The data collection procedure is carried out once the Wiki application has been used during the teaching period Processes and Educational Contexts, in the month of December of the year 2017, without informing the students that a study was going to be carried out.

At the end of the day, they were told that they should complete a questionnaire, in addition to holding a discussion group with two people prepared in this regard.

Before filling out the questionnaire, the rules were explained to complete it, as well as giving them only 10 minutes to complete it. At all times the students presented good predisposition for its preparation.

Regarding the discussion group, the data collection period ranged between 15 and 20 minutes, depending on the group. All conversations were transcribed for further analysis. The predisposition shown was positive.

For the analysis of the questionnaire data, we made use of the IBM SPSS Statics 20 program, while for the discussion groups, we selected key ideas.

Results

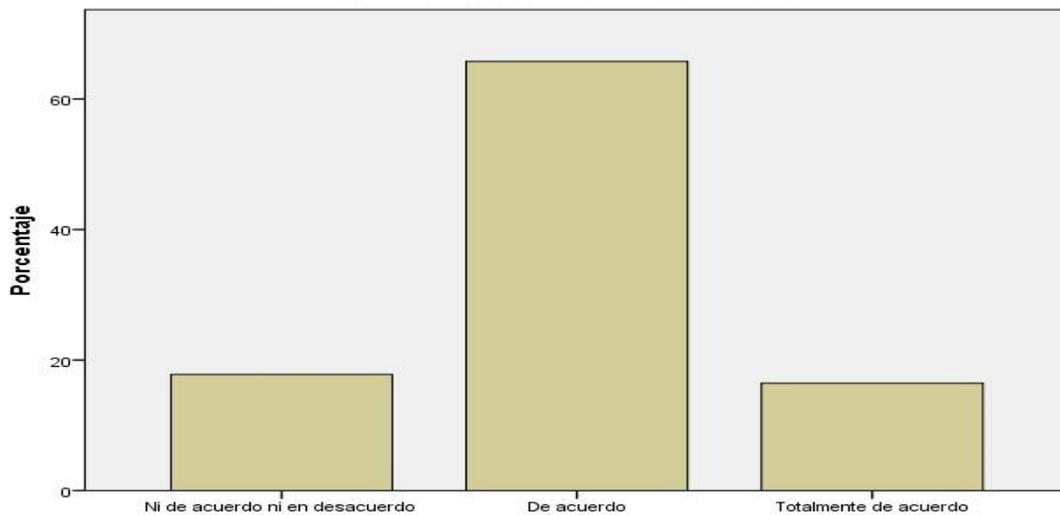
Descriptive analysis.

In general terms, they show that the assessment of students in relation to the use of the Wiki application is positive, so much so that there are items that are not included in the data that we present below because they were not selected by the respondents.

Regarding whether the use of the Wiki resource provides meaningful learning, the majority of students agree (65.8%), while the rest are either not in favor or against (17.8%) or totally agreement (16.4%), noting that the use of the Wiki application has involved the acquisition of significant learning for students.

Table 1.Provides meaningful learning

		Frequency	Percentage	Valid percentage	Accumulated percentage
Valid	Neither agree nor disagree	13	17,8	17,8	17,8
	Agree	48	65,8	65,8	83,6
	Totally agree	12	16,4	16,4	100,0
	Total	73	100,0	100,0	

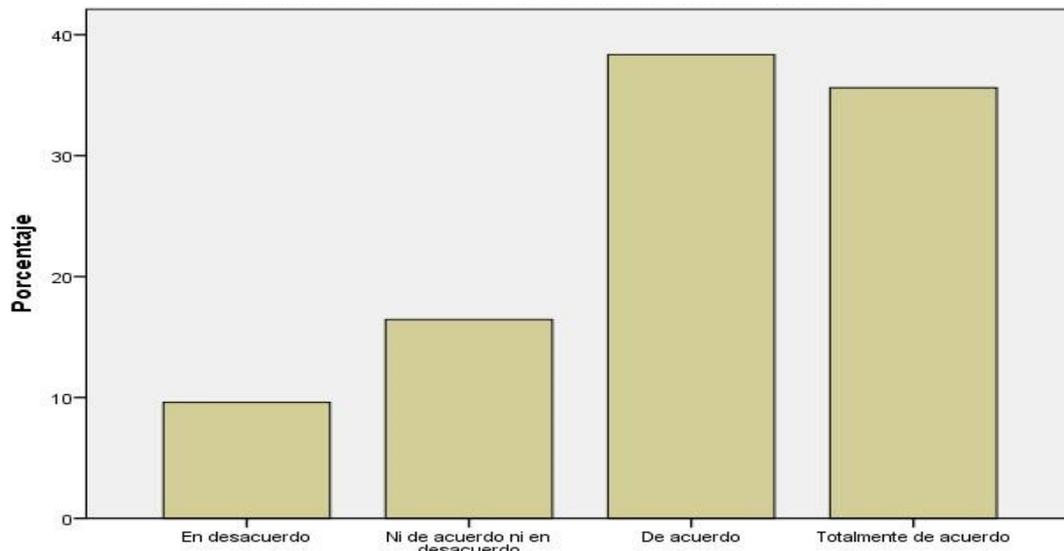


Graph 1. Significant learning in the use of the Wiki resource

As regard to whether it encourages collaborative learning, the majority considers that it is, in full agreement (35.6%) and in agreement (38.4%), while a minority is neither in favor nor against (16.4%) or disagree (9.6%). This shows that the formand values this resource as a tool that can encourage collaborative learning.

Table 2. Encourage collaborative learning

		Frequency	Percentage	Valid percentage	Accumulated percentage
Valid	In disagreement	7	9,6	9,6	9,6
	Neither agree nor disagree	12	16,4	16,4	26,0
	Agree	28	38,4	38,4	64,4
	Totally agree	26	35,6	35,6	100,0
	Total	73	100,0	100,0	



Graph 2. Collaborative learning in the use of the Wiki resource

Focusing on the issue itself encourages educational innovation, a high percentage considers it to be totally in agreement (46.6%) or in agreement (39.7%), while a small part of the respondents either do not agree or disagree (11%) or disagree (2.7%). For these students, the Wiki resource encourages educational innovation.

Table 3. Encourages educational innovation

		Frequency	Percentage	Valid percentage	Accumulated percentage
Valid	In disagreement	2	2,7	2,7	2,7
	Neither agree nor disagree	8	11,0	11,0	13,7
	Agree	29	39,7	39,7	53,4
	Totally agree	34	46,6	46,6	100,0
	Total	73	100,0	100,0	

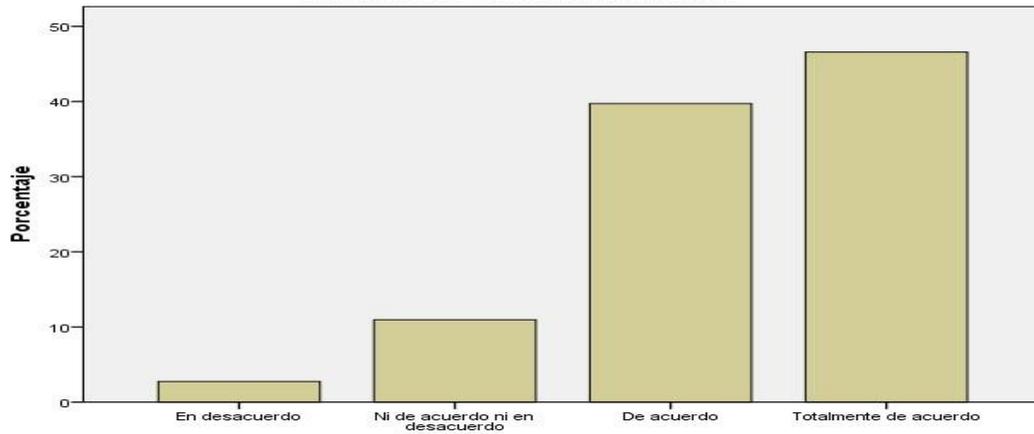
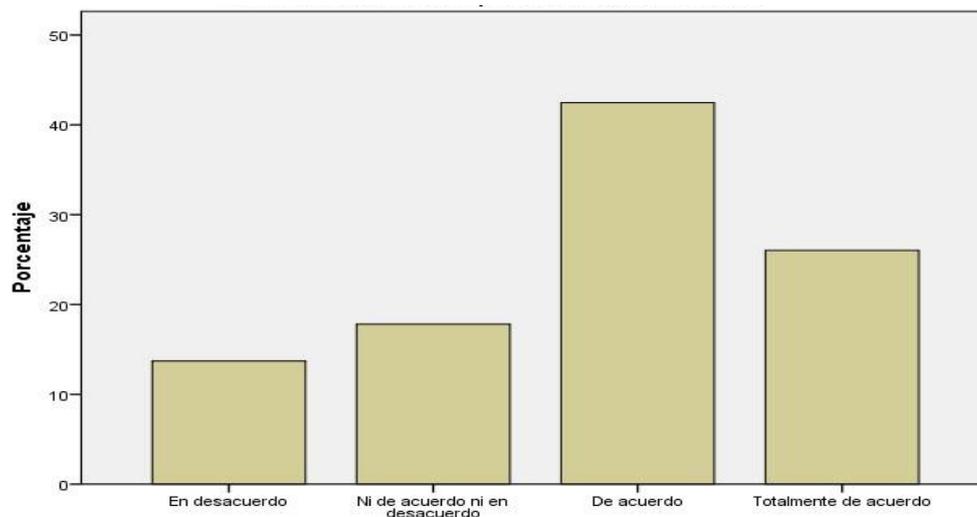


Figure 3. Promotion of educational innovation through the use of the Wiki application

Regarding the question of whether it favors the involvement of the students, a high percentage considers it to be in agreement (42.5%) or totally in agreement (26%), while a minority is neither in favor nor against (17.8%) or in disagreement (13.7%). Therefore, the formand considers that the use of the Wiki resource favors the involvement in the training process.

Table 4. Encourages the involvement of students

		Frequenc y	Percentag e	Valid percentage	Accumulat ed percentage
Valid	In disagreement	10	13,7	13,7	13,7
	Neither agree nor disagree	13	17,8	17,8	31,5
	Agree	31	42,5	42,5	74,0
	Totally agree	19	26,0	26,0	100,0
	Total	73	100,0	100,0	



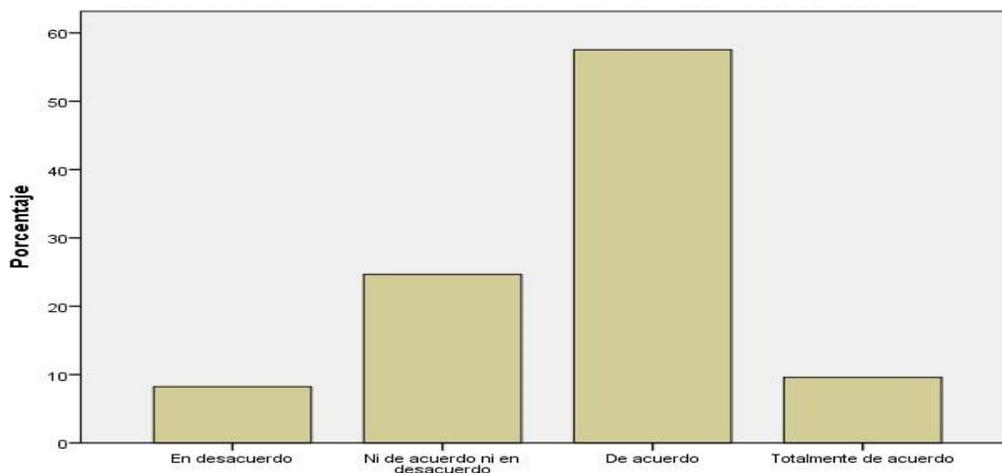
Graph 4. Involvement of students in the use of Wiki

If the use of the Wiki resource supposes more advantages than disadvantages in the teaching practice, the trend is not as high as in previous questions, even though the evaluation is still positive, observing that 57.5% agree, 24.7

% neither agree nor disagree; while 9.6% strongly agree and 8.2% disagree. For the student, this resource may have positive aspects, although with some drawbacks.

Table 5. It supposes more advantages than disadvantages in the teaching practice

		Frequency	Percentage	Valid percentage	Accumulated percentage
Valid	In disagreement	6	8,2	8,2	8,2
	Neither agree nor disagree	18	24,7	24,7	32,9
	Agree	42	57,5	57,5	90,4
	Totally agree	7	9,6	9,6	100,0
	Total	73	100,0	100,0	



Graph 5. Advantages in the use of the Wiki resource in the teaching and learning proces

Analysis group discussion data

Regarding the evaluation of experience, 87.5% have positively highlighted the experience, given that they are offered another different reality in the teaching and learning process. 12.5% have valued it negatively, because they feel more comfortable in the traditional method, which is what they have always been used to.

This has been very complicated for us. It is the first time we have experienced this way of being taught, and above all, the first time we work with Wiki. We prefer the traditional manner, we are more comfortable [Group 1]

We are delighted with the proposal. At the beginning we recognized that we were reluctant to develop the activity, but as it has progressed, we have felt more comfortable, and what is more important, we have learned to have fun [Group 7]

Regarding the fact that they made reference to the positive and negative aspects, 87.5% highlighted mainly positive aspects, enhancing the possibility of seeing another methodology different from the one considered classic and favoring socialization among peers. 12.5% observe as negative aspects the shortage of time to carry out the activity.

We see many positive aspects in the activity itself. Mainly, we do not get bored and we are entertained, talking with colleagues about actions to be developed in the activities, something that is done to be grateful at this time of the afternoon [Group 5]

We have been overwhelmed drowned the whole class, first because there is very little time to do the activity; second because we are many and it is difficult to agree; and third because we do not master the subject, and so it is more difficult to develop the activity [Group 1]

Finally, when they have been asked to establish proposals for improvement, 62.5% of the groups have agreed to indicate that for future classes, tasks related to Wiki resources will be carried out in smaller groups, and not so numerous, the rest of the groups consider that the activity is fine as it is presented.

It has been a bit complicated, in fact, to get so many people in agreement with the preparation of the requested documents. Also, some of us have worked more than others, and that is not fair [Group 3]

Conclusions

Students enrolled in the Master's Degree in Teacher Training in Compulsory Secondary Education, Baccalaureate, Vocational Training and Language Teaching in the Campus of Ceuta positively assess the Wiki resource in general. The students consider that they generate significant learning; encourages collaborative learning, coinciding with what was established by Gómez and Álvarez (2011); promotes educational innovation; favors the involvement of students, as established by Araujo (2017), where a shared effort is required by all students; and it offers more advantages than inconvenience, as is reflected in the theoretical framework of this research, where the positive aspects are much greater than the negative ones.

The fact of applying it in class, and knowing the students' assessment of its application, also shows that their ratings are positive, being happy with the proposal, although at the beginning it was more difficult due to lack of knowledge rather than motivation, and a small amount of training was necessary. its use, coinciding with Araujo (2017), which defends that the students must familiarize themselves with the resource.

They value positively the fact of using another methodology different from the traditional one, offering an alternative to traditional resources, as marked by Gómez and Álvarez (2011).

They also consider that it promotes socialization among peers, coinciding with Barberá (2009), and Giménez and González (2009), where they consider that solutions must be provided among all, reaching agreement in a consensual manner.

As proposals for improvement, they assessed the need to develop the Wiki resource in smaller groups, and the need to have more time for the development of the activity.

The fact of using the Wiki resource with future teachers is motivating for them in the development of the teaching and learning process, in addition to offering new tools for the development of teaching. It is important to generate small groups, since large groups can harm the normal development of the classroom.

As future lines of research, the influence of gender and specialties on the use and evaluation of the Wiki resource can be considered in the students who take the Master's Degree in Compulsory Secondary Education, Baccalaureate, Vocational Training and Language Teaching national.

References

- Araujo, J.C. (2017). Propuesta de utilización de wikis para el desarrollo de la expresión escrita mediante el trabajo colaborativo. *IKASTORRATZA. e-Revista de Didáctica*, 18, 80-105.
- Barberá, E. (2009). Filosofía wiki: el compromiso de las soluciones. *Red U – Revista de Docencia Universitaria. Número monográfico IV. Número especial dedicado a Wiki y educación superior en España (en coedición con Revista de Educación a Distancia – RED)*.
- Casamayor, G. (coord.) (2008). *La formación on-line. Una mirada integral sobre el e-learning, b-learning...* Barcelona: Editorial Grao.
- Castellanos, J., Martín, E., Pérez, D., Santacruz, L. P., y Serrano, L M. (2011). *Las TIC en la educación*. Madrid: Ediciones Anaya Multimedia.
- Cela, K., Fuerte, W., Alonso, C., y Sánchez, F. (2010). Evaluación de herramientas web 2.0, estilos de aprendizaje y su aplicación en el ámbito educativo. *Revista Estilos de Aprendizaje*, 5(5), 1-22.
- Chenoll, A. (2009). Web 2.0 y estilos de aprendizaje. Tú eliges cómo quieres aprender. *Biblioteca virtual redELE*, 11, 70-78.
- Colás, B., y Buendía, L. (1998). *Investigación Educativa*. Sevilla: Ediciones Alfar.
- Concepción, C.M. (2008). Wiki, internet y repositorios documentales. *Acimed*, 18(6), 1-3.
- De Haro, J. J. (2010). *Redes sociales para la educación*. Madrid: Ediciones Anaya Multimedia.
- Domínguez, G., y Llorente, M. C. (2009). La educación social y la Web 2.0: Nuevos espacios de innovación e interacción social en el espacio europeo de educación superior. *Pixel-Bit. Revista de Medios y Educación*. 35, 105-114.
- Espinosa, I. (2014). El gato de Dalí. Escritura cooperativa con wiki. *Foro de Profesores de E/LE*, (10), 75-82.
- García, M.D. (2016). El uso de blogs y wikis en la formación del traductor. *Revista tradumática*, (14), 147-155.
- George, D., y Mallery, P. (2003). *SPSS for Windows step by step: A simple guide and reference 11.0 update (4th ed.)*. Boston: Allyn & Bacon
- Giménez, A., y González, A. (2009). Un modelo de implementación de una wiki para la formación jurídica. *Red U - Revista de Docencia Universitaria. Número monográfico IV. Número especial dedicado a Wiki y*

- educación superior en España (en coedición con Revista de Educación a Distancia –RED)
- Gómez, V. (2017). ¿Cómo se involucran los estudiantes de pedagogía en una experiencia de blogging internacional en wikispaces? *Digital Education Review*, (31), 1-19.
- Gómez, M.C., Alvarez, J.D. (Ed.). (2011). *El trabajo colaborativo como indicador de calidad del espacio europeo de educación superior. Volumen I*. Alicante: Editorial Marfil.
- Marqués, P. (2007). La Web 2.0 y sus aplicaciones didácticas. *Didáctica, Innovación y Multimedia*.
- Martín, J.P. (2011). *Servicios Google como herramienta educativa*. Madrid: Ediciones Anaya Multimedia.
- Mora, F. (2012). Posibilidades educativas de la wiki. *Tecnología en Marcha*, 25 (3), 113-118.
- Mur, L. (2015). El aprendizaje de la historia con Wiki en Educación Secundaria. *Enseñanza de las ciencias sociales*, 14, 39-47.
- Palomo, R., Ruiz, J., y Sánchez, J. (2006). Las TIC como agentes de innovación educativa. *Junta de Andalucía. Consejería de Educación. Dirección General de Innovación Educativa y Formación del Profesorado*
- Sanz, J., Gil, J.M., y Marzal, A. (2007). El Wiki de la orientación y el asesoramiento vocacional. *REOP*, 18 (2), 255-271.
- Unturbe, A.; Arenas, M. C. (2010). *Internet como recurso educativo*. Madrid: Ediciones Anaya Multimedia.
- Vela, S.E., Medina, C., y Rodríguez, J.A. (2017). Impacto del uso e incorporación de una Wiki en el aprendizaje de la Biología. *EDUTECH. Revista Electrónica de Tecnología Educativa*, (59), 1-20.
- Villaroel, J. (2007). Usos didácticos del wiki en educación secundaria. *Ikastorratza, e-Revista de Didáctica*, 1, 1-7.
- Zamarrazo, J. M.; Amorós, L. (2011). *Las nuevas Tecnologías de la enseñanza de las Ciencias*. Sevilla: Editorial MAD.

Validity And Reliability Study Of Exercise Imagery Inventory For Individuals Doing Exercise

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Abstract

Imagery, one of the widely-used applications in sports psychology, is used in sports and exercise environments. The aim of this study is to test the validity and reliability of the Turkish version of the Exercise Imagery Inventory, which was developed by Giacobbi et al. (2010) with the aim of measuring the level of imagery of individuals in exercise environments. For this purpose "Exercise Imaging Inventory" was applied to 407 individuals doing exercise (age X: 22.12 ± 2.52). Exercise Imaging Inventory consists of 22 items in five subscales: Appearance-Health (8 items), Exercise Feelings (4 items), Exercise Technique (4 items), Exercise Routines (3 items) and Exercise Self-efficacy (3 items). Exercise Imagery Inventory is assessed using 7-point Likert-type questionnaire. In order to test the structural validity of the scale, principal components factor analysis (varimax rotation) was carried out. Five factor structures were determined in accordance with the original inventory with the results of principal component factor analysis, and the items explain 88.33% of the inventory. Reliability of the inventory was examined by Cronbach's alpha internal consistency coefficient. Internal consistency coefficients calculated for Exercise Imagery Inventory are 0.98 for Appearance-Health, 0.97 for Exercise Feelings, 0.96 for Exercise Technique, 0.73 for Exercise Routines and 0.95 for the Exercise Self-efficacy. According to the analysis results, it can be said that the Turkish version of the Exercise Imagery Inventory can be used to determine Exercise Imagery levels of individuals doing exercise.

Keywords: *Motivational Self Talk, Mental Toughness, friend support, Athlete*

Introduction

Mental toughness seems to be one of the most important psychological structures related with a good sports performance and mental imagery has importance in many fields of life like developing language skill, improving motivation, learning motor skills and increasing sportive performance (Feltz & Landers, 1983; Gammage, Hall, & Rodgers, 2000; Paivio, 1985; Rodgers, Hall, & Buckolz, 1991). Authors have recently proposed that mental imagery is also important for exercise behaviors (Gammage et al., 2000; Hall, 1995; Hausenblas, Hall, Rodgers, & Munroe, 1999). Hall (1995) has proposed that imagery could have a motivational and cognitive function similar with using an exercise tool.

Based on this opinion, training individuals have been found to use imagery due to basic internal causes including energy, appearance and technique (Gammage et al., 2000; Hausenblas et al., 1999; Hausenblas & Symons, 2002). Energy imagery is defined as mental images related with elevated energy and feelings of coping with stress. Appearance imagery is related with a thinner, fit and healthy appearance. Finally, technique imagery is related with straight posture and form of the body.

While energy and appearance imagery are related with motivation, technique imagery has a cognitive function. Hall (1995) has proposed that imagery could influence participation in exercise through the expectations about self-competence and its outcomes. Namely, use of imagery of individuals who do exercise enable them to image as if they have reached their target (for example, a better appearance, a better technique) and this increases the likelihood of maintaining exercise due to its effects on self- efficacy. Self-efficacy-related cognitions and also beliefs about this have been found to increase as exercise imagery increases (Hausenblas et al. 1999; Rodgers & Gauvin, 1998; Rodgers, Hall, Blanchard, & Munroe, 2001).

Researchers have reported that individuals who do sports more use more energy, appearance and technique imagery compared to individuals who do sports less (Gammage et al. 2000; Hausenblas et al. 1999). Consequently, exercise imagery has been found to be positively related with exercise dependence symptoms, consistently with the suggestions of Hall (1995) (Hausenblas & Symons Downs, 2002; Rodgers et al. 2001). Further studies are required for detecting whether the interventions which aim at changing imagery patterns are effective on risky individuals for exercise dependence and for evaluating the frequency and nature of imagery use. No studies have been encountered in literature investigating exercise imagery in Turkish population. In brief, exercise imagery is positively related with exercise motivation, self-efficacy, exercise dependence symptoms and exercise frequency. Based on these preliminary findings, a strong justification is present for performing a constant exercise imagery study. Because this may help our opinion about achieving and maintaining physical activity behavior. In addition, exercise imagery may be used as an interventinal tool for improving exercise behavior through increasing

motivation and self-efficacy for regular physical activity. This is important given that 40% of adults in USA do not do exercise in their spare time (USDHHS, 2000) and 50% of these sedentary adults abort exercise program until 6 months (Dishman,2001).

Our knowledge about exercise imagery may not be sufficient to explain the reasons for how individuals use exercise imagery, content of imagery and the purpose for using imagery. Under the light of these data, the aim of the present study is to adapt Exercise Imagery Inventory to Turkish culture.

Method

Reliability and validity of Exercise Imagery Inventory were tested on a total of 407 (Xage: 22.12 ± 2.52) participants (247 females with Xage: 22.72 ± 3.10 and 160 males with Xage: 21.72 ± 1.97) who were doing exercise as groups or individually at the universities and private training centers during 2014-2015. Mean duration of exercise was $71,42 \pm 48,71$ months for the participants who do different exercises (fitness, step-aerobic, pilates, zumba etc.).

<i>Gender</i>	<i>N</i>	<i>%</i>
<i>Female</i>	<i>247</i>	<i>60,7</i>
<i>Male</i>	<i>160</i>	<i>39,3</i>
<i>Total</i>	<i>407</i>	<i>100,0</i>

<i>Exercise type</i>	<i>N</i>	<i>%</i>
<i>Team</i>	<i>231</i>	<i>56,8</i>
<i>Individual</i>	<i>176</i>	<i>43,2</i>
<i>Total</i>	<i>407</i>	<i>100,0</i>

Data collection tools

Personal data form

The form was created by the researchers for collecting data about demographic characteristics of the participants like gender, age, exercise type.

Exercise Imagery Scale

Exercise Imaging Inventory was developed by Giacobbi et al. (2010) with the aim of measuring the level of imagery of individuals in exercise environments. Exercise Imagery Inventory is assessed using 7-point Likert-type questionnaire, it consists of 22 items in five subscales.

Translation and data collection

Standard translate-retranslate method which was recommended by Brislin (1986) was used for translation. The scale was translated to Turkish from English first and from Turkish to English thereafter. English scale was translated to Turkish by one specialist in English and two specialists in sports field. The items were compared with each other and the items which had the same translation were detected. The items with the same and different translation were translated to English again by the same specialists. Re-translated items were compared with original items, differences and errors were detected. The English translation was compared –with the original scale and the closest translations formed the final version of the scale. The scale was applied with face-to-face interviews by the researcher and took about five minutes.

Data analysis

In order to test the structural validity of the scale, principal components factor analysis (varimax rotation) was carried out. Reliability of the inventory was examined by Cronbach's alpha internal consistency coefficient. Analyses were done with SPSS 22.0 package program.

Results

Validity of Exercise Imagery Scale

Principal components factor analysis (varimax rotation) was carried out to test structural validity. In principal components analysis, KMO test was used to test whether partial correlations are small, distribution is sufficient for factor analysis and found as 0.88 for all participants. Barlett test was used to test whether factor analysis is proper for variables and found as 12429.817 ($p < 0.05$) for all participants.

Factor loads, variances and self-values of subscales obtained with principal components factor analysis varimax rotation performed for detecting factor structure of exercise imagery scale are presented Table 1.

Table 1: Factor analysis results of Exercise Imagery Scale

Subscales	Items	Factor loads	Self-efficacy	% Variance	% Cumulative
Factor 1 Exercise health	h2	,94	9,241	42,003	42,003
	h4	,94			
	h1	,93			
	h3	,93			
	h8	,92			
	h6	,92			
	h7	,92			
	h5	,86			
Factor 2 Exercise feeling	f3	,91	4,616	20,983	62,986
	f2	,90			
	f1	,89			
	f4	,89			
Factor 3 Exercise technique	t1	,88	2,811	12,779	75,765
	t3	,88			
	t4	,88			
	t2	,87			
Factor 4 Exercise routines	r2	,94	1,680	7,638	83,403
	r1	,93			
	r3	,91			
Factor 5 Exercise self-efficacy	s3	,79	1,085	4,931	88,335
	s2	,79			
	s1	,78			

Five factor structures were determined as the result of factor analysis. Structure of five factors determined as the result of principle component factor analysis explains 88.35% of “Exercise Imagery Scale”. Factor loads vary between 0.78-0.94. Eight items under factor 1 constitutes exercise health, 4 items under factor 2 constitute exercise feeling, 4 items under factor 3 constitutes exercise technique, 3 items under factor 4 constitute exercise routines and 3 items under factor 5 constitute self-efficacy subscales.

Reliability of Exercise Imagery Scale

Cronbach alpha value was tested for determination of reliability of “Exercise Imagery Scale” which is a Likert type scale. Item prediction power of the items in subscales of the scale, Cronbach alpha reliability coefficient of the subscale when item is deleted and multiple correlation values for all participants are presented in the table below.

Table 2: Analysis of each item related with exercise health subscale of Exercise Imagery Scale

	Scale Mean if Item Deleted	Variance if Item Deleted	ifCorrected Total Correlation	Item-Squared Correlation	MultipleCronbach's Alpha if Item Deleted
h1	32,85	186,893	,938	,912	,980
h2	32,71	186,527	,948	,929	,979
h3	32,81	186,610	,941	,908	,979
h4	32,77	185,609	,951	,911	,979
h5	33,14	192,086	,833	,706	,985
h6	32,96	186,991	,933	,892	,980
h7	32,95	187,554	,930	,908	,980
h8	32,91	187,193	,941	,908	,979

Cronbach's Alpha= 0,983

Cronbach alpha internal consistency coefficient of exercise health subscale was found as 0.98. When Cronbach alpha coefficient obtained when each item is deleted is evaluated, reliability coefficient is seen to decrease. Total correlation coefficient of subscales in exercise health subscale were found between 0.83 (item h5) and 0.95(item h2).

Table 3: Analysis of each item related with exercise technique subscale of Exercise Imagery Scale

	Scale Mean if Item Deleted	ifScale Variance if Item Deleted	ifCorrected Total Correlation	Item-Squared Correlation	MultipleCronbach's Alpha if Item Deleted
t1	13,52	32,196	,920	,850	,957
t2	13,40	32,452	,918	,850	,957
t3	13,43	32,753	,921	,853	,957
t4	13,54	31,673	,917	,847	,958

Cronbach's Alpha= 0,968

Cronbach alpha internal consistency coefficient of exercise technique subscale was found as 0.97. When Cronbach alpha coefficient obtained when each item is deleted is evaluated, reliability coefficient is seen to decrease. Total correlation coefficient of subscales in exercise technique subscale were found between 0.91 (item t4) and 0.92 (item t3).

Table 4: Analysis of each item related with exercise feeling subscale of Exercise Imagery Scale

	Scale Mean if Item Deleted	ifItemScale Variance if Item Deleted	ifCorrected Total Correlation	Item-Squared Correlation	MultipleCronbach's Alpha if Item Deleted
f1	13,85	34,826	,910	,839	,954
f2	14,00	34,660	,929	,868	,949
f3	13,95	34,458	,930	,865	,948
f4	14,06	35,652	,880	,779	,963

Cronbach's Alpha= ,965

Cronbach alpha internal consistency coefficient of exercise feeling subscale was found as 0.97. When Cronbach alpha coefficient obtained when each item is deleted is evaluated, reliability coefficient is seen to decrease. Total correlation coefficient of subscales in exercise feeling subscale were found between 0.88 (item f4) and 0.93 (item f3).

Table 5: Analysis of each item related with exercise self-efficacy subscale of Exercise Imagery Scale

	Scale Mean if Item Deleted	ifItemScale Variance if Item Deleted	ifCorrected Total Correlation	Item-Squared Correlation	MultipleCronbach's Alpha if Item Deleted
ö1	9,75	29,390	,676	,745	,583
ö2	9,49	28,551	,722	,760	,543
ö3	9,33	15,493	,508	,267	,926

Cronbach's Alpha= 0,727

Cronbach alpha internal consistency coefficient of exercise feeling subscale was found as 0.73. When Cronbach alpha coefficient obtained when se3 item is deleted is evaluated, reliability coefficient is seen to increase and it is seen to decrease when other items are deleted. Total correlation coefficient of subscales in exercise feeling subscale were found between 0.51 (item se4) and 0.72 (item se3).

Table 6: Analysis of each item related with exercise routines subscale of Exercise Imagery Scale

	Scale Mean if Item Deleted	ifScale Variance if Item Deleted	ifCorrected Total Correlation	Item-Squared Correlation	MultipleCronbach's Alpha if Item Deleted
r1	9,08	15,289	,882	,794	,927
r2	9,03	14,938	,916	,841	,900
r3	8,92	15,259	,866	,759	,939

Cronbach's Alpha=0,947

Cronbach alpha internal consistency coefficient of exercise feeling subscale was found as 0.97. When Cronbach alpha coefficient obtained when se3 item is deleted is evaluated, reliability coefficient is seen to decrease. Total correlation coefficient of subscales in exercise feeling subscale were found between 0.87 (item r3) and 0.92 (item r2).

Conclusions

This research was conducted with the aim of presenting some empirical evidence about reliability and validity of Exercise Imagery Scale which was developed by Giacobbi et al. Internal consistency reliability coefficients were between 0.69 and 0.83 for subscales of Exercise Imagery Scale, test-retest reliability coefficients were found

between 0.73 and 0.98. Internal consistency reliability coefficients obtained for each of five subscales are between 0.80 and 1.00 which is stated as quite reliable by Alpar (2001). Internal consistency reliability coefficients of Exercise Imagery Scale which is composed of 22 items and 5 factors were found between 0.65 and 0.80 in the study of Giacobbi et al. (2010). As stated by DeVellis (2016), internal consistency coefficient's being between 0.65 and .80 indicates sufficient values.

Turkish form of Exercise Imagery Scale of which final version was formed under the light of translate-retranslate method and expert opinions was applied to exercise participants. Basic components analysis was done for testing structural validity of the scale. Five factor structures were detected for Exercise Imagery Scale. Structure of five factors determined as the result of basic component factor analysis explains 88.35% of "Exercise Imagery Scale". Factor loads vary between 0.78-0.94. Eight items under factor 1 constitutes exercise health, 4 items under factor 2 constitute exercise feeling, 4 items under factor 3 constitutes exercise technique, 3 items under factor 4 constitute exercise routines and 3 items under factor 5 constitute self-efficacy subscales. Alpar (2001) states that .45 and above factor load is acceptable. Erefe (2002) and Özgüven (1999) report that item factor load up to .30 is acceptable. So the values obtained in this study may be stated to be consistent with criteria.

In conclusion, it may be stated that Exercise Imagery Scale could be used reliably and valid for measuring exercise imagery levels of the participants under the light of the results obtained from reliability and validity study of Turkish form of the scale. The results of the present study should be evaluated considering some limitations. For example, structural validity and internal consistency coefficients of only validity and reliability were analyzed. Additional researches are required for obtaining more detailed information about psychometric features of the scale. Testing the scale in different groups is also required. It is suggested that performing criteria validity of the scale, analyzing the relationship between different concepts and making factor analysis separately for males and females in future studies would contribute to reliability and validity of the scale. The relationships between the above mentioned variables could be understood better in future longitudinal and/or cross-sectional studies.

References

- Alpar R. (2001). Spor Bilimlerinde Uygulamalı İstatistik. Nobel Yayın Dağıtım, Ankara.
- Brislin, R.W. The wording and translation of re- search instruments. In: Lonner WJ, Berry JW, eds. Field Methods in Educational Research. 1st ed. Newbury Park, CA: Sage Publications; 1986. p.137-64.
- DeVellis, R. F. (2016). Scale development: Theory and applications (Vol. 26). Sage publications.
- Erefe İ. (2002). *Veri toplama araçlarının niteliği*. İ Erefe (ed), *Hemşirelikte Araştırma*, İstanbul: Odak Ofset, s.169-188.
- Felz, D. L., & Landers, D. M. (1983). The effects of mental practice on motor skill learning and performance: A meta-analysis. *Journal of Sport Psychology*, 5, 25–57.
- Gammage, K. L., Hall, C. R., & Rodgers, W. M. (2000). More about exercise imagery. *The Sport Psychologist*, 14, 348–359.
- Giacobbi Jr, P. R., Tuccitto, D. E., Buman, M. P., & Munroe-Chandler, K. (2010). A measurement and conceptual investigation of exercise imagery establishing construct validity. *Research quarterly for exercise and sport*, 81(4), 485-493.
- Giacobbi Jr, P., Hausenblas, H., Fallon, E., & Hall, C. (2003). Even more about exercise imagery: A grounded theory of exercise imagery. *Journal of Applied Sport Psychology*, 15(2), 160-175.
- Hall, C. R. (1995). The motivational function of mental imagery for participation in sport and exercise. In J. Annett, B. Cripps, & H. Steinberg (Eds.), *Exercise addiction: Motivation for participation in sport and exercise* (pp. 15–21). Leicester, UK: British Psychological Society.
- Hausenblas, H. A., & Downs, D. S. (2002). How much is too much? The development and validation of the exercise dependence scale. *Psychology and health*, 17(4), 387-404.
- Hausenblas, H. A., Hall, C. R., Rodgers, W. M., & Munroe, K. J. (1999). Exercise imagery: Its nature and measurement. *Journal of Applied Sport Psychology*, 11, 171–180.
- Özgüven İ.E. (1999). *Psikolojik Testler*. Üçüncü baskı, Ankara: PDREM Yayınları, s.35-48.
- Paivio, A. (1985). Cognitive and motivational functions of imagery in human performance. *Canadian Journal of Applied Sport Sciences*, 10, 22s–28s.
- Rodgers, W. M., & Gauvin, L. (1998). Heterogeneity of incentives for physical activity and self-efficacy in high active and moderately active women exercisers. *Journal of Applied Social Psychology*, 28, 1016–1029.
- Rodgers, W. M., Hall, C. R., Blanchard, C. M., & Munroe, K. J. (2001). Prediction of obligatory exercise by exercise-related imagery. *Psychology of Addictive Behaviors*, 15, 152–154.
- Rodgers, W., Hall, C., & Buckolz, E. (1991). The effect of an imagery training program on imagery ability, imagery use, and figure skating performance. *Journal of Applied Sport Psychology*, 3, 109– 125.
- U.S. Department of Health and Human Services (2000). *Physical activities and health: A report of the surgeon general*. Atlanta, GA: Centers for Disease Control and Prevention, National Center for Chronic Disease Prevention and Health Promotion.

Visualising Sprego Inequality Problems With 2d Representations

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Abstract

In K-12 ICT education it is a common practice to solve spreadsheet problems by browsing various problem specific functions. This approach leads students to utilize methods that only require slow thinking on a low abstraction level, and therefore does not lead to long-lasting knowledge and reliable decisions. The Sprego (Spreadsheet Lego) methodology focuses on solving real world problems by building up step-by-step algorithms. This allows and encourages students to deconstruct problems into smaller subtasks using high mathability approaches and solutions. The coding process is based on the functional language of spreadsheets with a reasonably small function-base, strictly restricted to general purpose spreadsheet functions. Beyond that Sprego emphasizes the connection between this approach and common programming principles. Previous research has proved that this methodology not only develops the students' algorithmic and computational thinking skills, but does so in a more effective way than working with the built-in, problem specific functions in distinct spreadsheet management interfaces.

To support the learning processes with Sprego, various unplugged and semi-unplugged tools have been developed and introduced in education. In our previous work we presented our 2D HTML5 application designed to provide visual representations for the most common Sprego implemented spreadsheet problems and their composite formulas: conditional counting and linear search. We designed the software to include game-like experiences with visually engaging presentations based on real-world examples that stimulate multiple sensory organs. We introduced our application to students and teachers alike and both groups found it helpful and supportive in teaching with the Sprego methodology.

In our current work we made several adjustments and amendments to our software, based on feedback received. We also introduced a visual representation of the generalization of the conditional counting problem, applying composite array formulas. The generalization is presented in a new example-problem, which is based on inequality borrowed from a real-world situation which pupils are familiar with, namely the various restrictions (weight, height, age, etc.) in place in amusement parks. Using Sprego to solve this inequity problem is based on the algorithm of conditional equality problems. The extension of the Sprego 2D application is in accordance with our practice of including real-world spreadsheet problems in our teaching methods. Beyond this, it further supports schema-construction, applying the algorithm introduced in the first version of the application. This approach facilitates learning with Sprego, and spreadsheets in general, and prepares students for further studies in traditional programming and database environments.

Introduction

Our Sprego project focuses on developing the algorithmic, computational thinking, and high-mathability computer problem solving skills of elementary and high school students. Generally, these skills only emerge in the context of programming education (Soloway, 1993; NAT, 2012; Kerettanterv, 2013); however, we have found that treating these problems as birotical software-related problems serves our purposes and covers a large chunk of the curriculum (NAT, 2012; Kerettanterv, 2013). Beyond its educational goals, using birotical applications is part of our everyday life and work; these are programmes which cannot be avoided.

Recognizing the necessity of birotical applications, software companies promote their products as user-friendly, with interfaces and tools including wizards and various help tools. Applying this approach results mainly in unplanned sequences of commands carried out by untraceable series of mouse activities, which only require slow thinking on a low abstraction level (Panko, 2013). Consequently, most birotical documents are error-filled, which wastefully uses up both human and computer resources (Ben-Ari, 1999; Panko & Port, 2013; Panko, 2015; EuSpRIG, 2018).

In addition to the software companies' user-friendly slogans, the frame curricula for Informatics in Hungary – in both primary and secondary education (NAT, 2012; Kerettanterv, 2013) – mainly focuses on the tools used, while the textbooks mainly cover non-practice-based topics (Anderson, 2017; Csernoch, 2017). This approach covers

only one level of the three knowledge levels defined in the IEEE&ACM report (2013).

- familiarity: “The student understands what a concept is or what it means. This level of mastery concerns a basic awareness of a concept as opposed to expecting real facility with its application. It provides an answer to the question ‘What do you know about this?’.”
- usage: “The student is able to use or apply a concept in a concrete way. Using a concept may include, for example, appropriately using a specific concept in a program, using a particular proof technique, or performing a particular analysis. It provides an answer to the question ‘What do you know how to do?’.”
- assessment: The student is able to consider a concept from multiple viewpoints and/or justify the selection of a particular approach to solve a problem. This level of mastery implies more than using a concept; it involves the ability to select an appropriate approach from understood alternatives. It provides an answer to the question ‘Why would you do that?’.”

The definition of the three levels of knowledge is in complete accordance with the well-known concept-based problem-solving method developed by Pólya (1954). The only difference is that while Pólya envisaged four steps, emphasizing the importance of planning – the second step –, this report, which deals with computer related levels, merges the understanding and the planning steps (Csernoch & Biró, 2015a).

In general, the user-friendly classical methods ignore the first level of mastery – familiarity –, and also make the third level – assessment – inaccessible (IEEE&ACM, 2013). We concluded that both the user-friendly approaches and most of the textbooks are restricted only to the second level – usage (Csernoch, 2017). These low-mathability approaches in spreadsheets recommend browsing around and using numerous problem-specific functions (Csernoch & Biró, 2018), whose number in MS Excel was close to 600 at the time the present paper was written (Microsoft, 2018a). Furthermore, in the Hungarian spreadsheet textbooks we analyzed almost 200 problem specific functions were mentioned (Csernoch et al., 2014). It is unreasonable to expect students to memorize all the names of the functions, their lists of arguments, and (sometimes non-conventional) syntactic rules (Csernoch, 2014). It was for these reasons that it was found necessary to introduce a novel teaching approach – Sprego: Spreadsheet Lego – for end-user spreadsheet management (Csernoch, 2014). As with all novel methods (Anderson, 2017), we found that there are teachers who, despite being aware of more effective methodologies than the ones they use in practice, prefer to stick to their “good old” approaches. This attitude to novel approaches can, on the one hand, be explained by the sunk-cost fallacy (Kahneman, 2011), and on the other hand, by teachers’ belief in the fixed nature of the sciences (Chen et al., 2015).

Sprego

Our research team focuses on the development of the algorithmic and computational thinking skills used in birotical interfaces. This novel approach uses methodologies that support the learning processes by focusing on high mathability (Pólya, 1954; Baranyi & Gilanyi, 2013; Biró & Csernoch, 2015a, 2015b) concept-based problem-solving methods. Among these methods Sprego (Csernoch, 2014) is developed to teach end-user spreadsheet management and functional programming (Wakeling, 2007; Sestoft, 2011). In Sprego, instead of using a high number of problem specific functions, the focus is on a low number of general purpose functions, and algorithm and schema construction (Skemp, 1971; Merriënboer & Sweller, 2005; Csernoch et al., 2014, 2015). One further priority of Sprego is the application of authentic content, which plays a crucial role in motivating students and in applying the four levels of concept-based problem-solving (Pólya, 1954) and the three levels of knowledge (IEEE&ACM, 2013) in real-world problem-solving environments (Csernoch, 2009; Csernoch & Biró, 2015a, 2015b, 2015c; Csapó, 2017a; Csernoch & Dani, 2017). Using concept-based problem-solving approaches to build algorithms, and composite and array formulas to code the algorithms is intended to develop the students’ algorithmic and computational thinking skills (Wing, 2006). The method was designed (based on the general functions and programming concepts it uses) so as to be able to work in all well-known spreadsheet management environments, and therefore it is software and version independent.

Because the primary goals of Sprego are to develop fundamental skills, to aid the construction of algorithms, and to make the understanding and problem-solving processes more effective, we use unplugged and semi-unplugged tools (Bell & Newton, 2013; Biró & Csernoch, 2017a, 2017b). Within this framework, we developed a 2D graphical educational software for the Sprego methodology to provide visual context and graphical tools for the Sprego problems. Our application was published in 2017 and dealt with two problems: (1) conditional counting and (2) linear search (Csapó & Sebestyén, 2017).

Motivation

We have found that one of the major problems with user-friendly teaching approaches is that they focus on interfaces and tools, instead of the problems themselves. These surface-approach methods, beyond the excellently communicated and marketed “user-friendly” slogans, is well-represented by the decontextualized material used in help tools and coursebooks (Angeli, 2013; Csernoch, 2017). In general, we can conclude that in the user-friendly “usage-focused” methodologies tools receive most attention, and the primary objective is to use these tools;

consequently, they belong to the category of low-mathability computer problem-solving approaches (Baranyi & Gilanyi, 2013; Panko, 2013; Biró & Csernoch, 2015a, 2015b). As a result, the knowledge gained in such environments – if knowledge is developed at all – cannot be transferred to other problems or other interfaces. If the interface or/and the topic changes, or students have to apply their knowledge to solve a problem in a real-world setting, they are not able to do so (Csapó, 2003). Consequently, students cannot use these unconnected pieces of information (knowledge fragments) in other school subjects, nor outside of school.

With our high-mathability approach, we focus on real-world problems whose contents are interesting and motivating. Beyond developing the fundamental skills, our further goal is to create long lasting and transferable knowledge which students can use in various settings. This explains why we focus on building schemata which can be called upon by the use of fast thinking (Kahneman, 2011). To build up schemata, beyond the application of the minimalized number of Sprego functions, our method is to present a great number of similar problems in different authentic and motivating contexts, and make students recall the suitable algorithm(s) and apply and/or modify them to the actual problem (Skemp, 1971).

Completed Problems

Prior to our current work, our 2D graphical representation application contained two spreadsheet problems (Csapó & Sebestyén, 2017). Because Sprego makes intensive use of multilevel functions and the Russian matryoshka dolls as our unplugged tools in order to demonstrate the connection between the domains and ranges of the functions, the avatars in our application are digital matryoshka dolls.

The first problem is based on conditional counting with a three-level array formula, and the second is a linear search problem with a two-level composite formula.

The structure of the Sprego application is the following:

- By launching the application, the problems are listed in the main menu. On this page the users can select the problem they would like to deal with.
- After selecting the problem, the users must decide on the initial settings of the problem. These selections provide the input data for the variables set up in the application. For example, on this opening page we can select the color of our avatar.
- Furthermore, the software includes options to select the language of the interface and the formulas (currently English and Hungarian languages are supported), and a button is provided to turn on/off the sound effects.
- To start the animation of the selected problem we must click on the Start button. After that, the presentation page appears on the screen and the animation starts automatically.

The presentation page is divided into two panels:

- The left panel contains the real-world setting and the animation which plays the representation based on this real-world situation.
- The right side of the screen is reserved for the formula-evaluator, which is similar to those that can be found in spreadsheet interfaces (Csernoch, 2014). Using the formula-evaluator the students can follow the steps of the evaluation process in parallel with the animation.

Conditional counting: the equality problem

One of the tasks presented in our previous paper (Csapó & Sebestyén, 2017) is a conditional counting problem, where the program counts the number of dolls which match the condition (the selected color). The question for the problem is that “*How many dolls have the selected color?*”.

The steps of the algorithm are the following. (Note that the steps described here are based on our previous publication and are modified in our current work which includes the revised version of the presentation based on the feedback our team received.)

The users select a color on the opening page and the program switches to the animation page. On the animation page both the play (left) and the evaluation (right) panel start automatically. In the play panel the dolls are dancing around a campfire, while the evaluation panel follows the play (Figure 1).

1. At the top of the animation area there is a check-point (marked with a pile of rocks), where the program tests the color of the passing dolls by asking yes/no questions. The question for each doll is whether the color of the passing doll is the same as the color of the doll selected in the menu. The results of the tests can be either True or False logical values, which are displayed in the evaluation panel. In the play panel, if the doll's color does not match the selected color, the dancing doll is faded. In the other case, when the two colors match, the doll keeps her original opacity.
2. In the second round, the role of the check-point changes: here the True answers must be marked. Since we display two panels on the screen, we use two markers in parallel. In the play panel the True dolls are moved into an inner circle (Figure 1), while in the evaluation panel they are marked with 1s, as occurs in the formula.

- The final step is the counting itself. The program counts the number of dolls in the smaller circle by adding the 1s of the vector consisting of 1s and Falses, displayed in the evaluation panel.



Figure 1: A campfire setting with our avatar dolls in the play panel (left side) and with the evaluation panel (right side). In the scene presented here a conditional counting problem with checking equality was solved.

The modification of the equality problem

In the first version of the 2D Sprego educational application, the first two steps were merged. The program automatically changed the dolls' markers to 1s before the True logical values were displayed. However, during the testing period we found that separating the two steps makes the students understand the algorithm more effectively, the solution more general, and more easily transferable to other problems and interfaces.

Linear search

The second problem completed in the first version of the 2D Sprego application was linear search.

A street scene is set up, where the postwoman must deliver a letter to the selected doll living in the corresponding house, so she has to know in which house the doll lives. The exact question is "In which house does the doll live?".

The algorithm involves the following steps:

As in the conditional counting problem, the users must select a doll from nine different colors offered in the menu. The arrangement of the animation page is the same as in the case of the conditional counting problem: the left side contains the play panel, while the right side shows the evaluation panel. However, the set-up is different. The problem is placed in a street scene: nine houses with nine dolls are displayed and a postwoman stands at the beginning of the street.

- The postwoman goes from doll to doll and checks their color. Every checked doll gets an index starting at 1, then 2, etc., which is their record number, shared by the doll and the house. These numbers are displayed on the evaluation panel (Figure 2).
- When the postwoman finds the selected doll, both she and the animation stop for a moment to emphasize the separation of the steps. In the following step, the selected doll, based on its record number, is matched with the corresponding house in the vector of the houses, and the letter is delivered.



Figure 2: A street setting with our avatar dolls and their houses in the animation panel (left side) and with the evaluation panel (right side). In the scene presented here a linear search problem was solved.

The modification of the linear search problem

Compared to the first version of the linear search problem representation we included several modifications to help students better understand and separate the distinct steps of the algorithm. Adjustments were made in the timing of the steps, and supportive new graphical elements and animations were added to the formula-evaluator.

Novel Features: A Conditional Inequality Problem

Background

In the first version of our 2D representational program a conditional counting problem was presented, as discussed in the “*Conditional counting: the equality problem*” subsection (Csapó & Sebestyén, 2017), where the equality of values was checked. In traditional user-friendly approaches, using and/or browsing built-in spreadsheet functions, handling equality, inequality, and inequality with constants and variables require different and non-conventional syntax (Csernoch, 2014):

- =COUNTIF(A1:A4,10), equality with constant (Microsoft, 2018b),
- =COUNTIF(A1:A4,D1), equality with variable (Microsoft, 2018b),
- =COUNTIF(A1:A4,"<3"), inequality with constant (Microsoft, 2018b),
- =COUNTIF(A1:A4,"<"&D1), inequality with variable (Microsoft, 2018b).

Similar conditional built-in functions make things even more complicated when the order of the arguments varies according to the number of conditions (one condition or more, *IF() or *IFS() functions, respectively) (Figure 3):

- COUNTIF(range, criteria) (Microsoft, 2018b),
- COUNTIFS(criteria_range1, criteria1,...) (Microsoft, 2018c),
- SUMIF(range, criteria, [sum_range]) (Microsoft, 2018d),
- SUMIFS(sum_range, criteria_range1, criteria1) (Microsoft, 2018e),
- AVERAGEIF(range, criteria, [average_range],...) (Microsoft, 2018f),
- AVERAGEIFS(average_range, criteria_range1, criteria1,...) (Microsoft, 2018g).

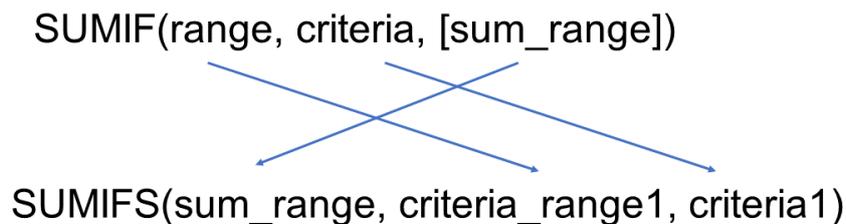


Figure 3: The changes in the order of arguments in the SUMIF() and SUMIFS() built-in functions (Csernoch, 2014).

To avoid this discrepancy, Sprego would serve our interest. With Sprego, the same algorithm and the same syntax are used regardless of the logical operator and whether it is a constant and/or variable which contains the values we wish to compare (Csernoch, 2014; Csernoch & Biró, 2015a, Csernoch, 2017). With the generalized and conventional form of handling yes/no questions we can provide sufficient background to build schemata and recall them.

Design

To represent the algorithm of an inequality problem, and following from the logic and contexts of the previous presentations, we selected a real-world problem, familiar to students. Our choice fell upon an amusement park, where there are attractions which can only be used if certain conditions in terms of weight, height, or age limits are met. We created an amusement park design with a roller coaster in the background and a Ferris wheel with 8 cabins. In addition, we modified our avatar dolls to match the requirements of the real-world set-up. For the selection of dolls based on height and weight we created dolls of different shapes and heights as the avatars of the amusement park (Figure 4).

Furthermore, we wanted to introduce variables and inequality logical operators, so in the menu the users must select the desired height value and the operator associated with it. The selected height limit is stored in a variable and presented both on the play and evaluation panels of the animation page.

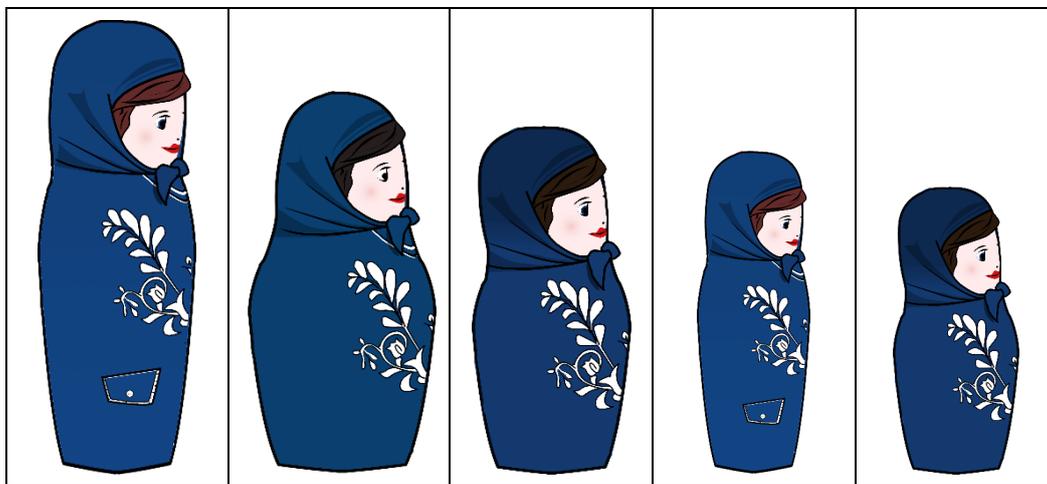


Figure 4: The modified blue dolls of different heights and shapes.

How many dolls are shorter/higher than the selected limit?

The new problem we included is based on the following question: “How many dolls can sit on the Ferris wheel?” (Figure 5). This new problem is based on the inequality of a chosen height-limit-value stored in a variable and the height-value of each doll avatar.

The steps are the following:

1. Similarly to the equality problem, the first step of the algorithm is to ask yes/no questions – for example: «*dolls' height > selected height limit?*». The outputs of the yes/no questions are True or False values for each item in the vector. The True and False values are displayed on the evaluation panel, while in the play panel the False dolls lose their original opacity and become dimmed in the queue.
2. In the following step a marker must be selected. Here, the IF() function is called. The True dolls receive 1s and can sit on the Ferris wheel, while the False dolls must leave the scene with their False values.
3. In the last step of the algorithm, we sum up the 1s and Falses stored in the output vector of the IF() function, which means that we sum up the 1s and ignore the Falses. With this final step we can answer the question of how many dolls can sit on the Ferris wheel.



Figure 5: An amusement park setting where a conditional counting problem with inequality and a variable was solved. In the scene presented here the play panel is on the left side, while the evaluation panel is on the right side. In the screenshot the IF() function marks the True values with 1, while the False values are left to the default forms.

We can apply the same algorithm if we want to set up any other restriction in the different attractions of the amusement park. In this case, the measuring tool has to be changed to a different type of scale. This option offers the possibility of expanding our application with further representations on novel inequality problems in the future.

Development

The development process of our new problem presentation started with a revision of the existing conditional counting problem. Since the algorithm behind the two problems is identical, it was logical to first establish a frame for these algorithm representations on which our novel problem can be built. Deriving from the first version, the software was developed using the Construct 2 event-action based visual programming engine (Scirra, 2018a), and as such this process also serves as an example of how educational applications can be developed using visual programming IDEs (Integrated Development Environments).

The implementation of the inequality problem brought with it the need to refactor several aspects of the previous code in order to keep the existing functionality running uninterrupted while also expanding the possibilities of the codebase. This step mainly affected the design and code behind the evaluation panel. During the development of the animation of the amusement park setting we kept in mind the need to design the code in such a way that it allows rapid modifications at several stages of the presentation in case the need arises after feedback has been received from students and teachers.

Developing with Construct 2 comes with several advantages, including the rapid implementation process and the ease of constructing 2D environments using the built-in tools. However, developers working with this IDE have to take its limitations into account. Given the design of the underlying engine, we had to resort to some workarounds while implementing specific features. Because Construct 2 does not include out-of-the box advanced tools for creating paths for objects to follow, we had to set up several checkpoints on the layout (Figure 6). Our algorithm examines the state of each doll in order to determine the next checkpoint it has to reach. In the following step, it calculates the dolls' movement angle based on these data.



Figure 6: The movement checkpoints placed on the layout to manage the movement system of the dolls.

Another stage of the development process that slowed down the implementation was the automatic resizing of the dolls. When the avatars first appear on the left side of the play panel they have to change their displayed image size to match the observable distance between them and the closest point of the amusement park (the scale) without users noticing this. To achieve this, our application constantly changes the size of each doll in advance of being measured on the scale. Their scaling rate is calculated based on their current Y position relative to the Y position of the scale. The dolls' sizes reach their maximum values (which were randomly selected in given intervals at the beginning of the presentation) when they reach the level of the scale on the Y-axis, and they keep their size until their height is re-evaluated by the IF() function (when they pass through the gate).

The dolls whose height makes them suitable for sitting on the Ferris wheel must be resized again while they walk towards their cabin. In addition, their size must be changed by a different scale ratio than before. We developed an algorithm that calculates the height of the moving dolls based on the Y coordinates of their start (at the gate) and end (at the cabin) positions, the distance of which is the difference between these two values (the travel distance on the Y-axis) and the current Y coordinate of the dolls. Using these coordinates and calculated data, the algorithm resizes the moving dolls seamlessly based on their current Y position. At the end of their movement (when they arrive at their cabins) the dolls will have a preferred, smaller size compared to the original, symbolizing the observable distance between the gate and the Ferris wheel.

Following on from our practice while developing the first version, we also focused on optimizing the application to make it run seamlessly on older or slower devices, as well. Optimizations include minimizing the GPU fill-rate as well as lowering the CPU consumption of by the objects present on the screen.

The new version of the Sprego Application is available to download for free on Google Play (Csapó & Sebestyén, 2018) for Android devices with built in WebKit support (Android 5 or newer versions). Given the nature of the Construct 2 engine, our application is also available in HTML5 format, currently integrated into the Sprego Virtual Collaboration Space (Csapó, 2017b).

Since the release of the first Sprego application version, the beta edition of its successor engine, Construct 3 has been released (Scirra, 2018b). Nowadays, Construct 3 can be considered a stable option to develop applications. Therefore, we plan to port our code to the new version of the engine in the near future. This can bring several enhancements to our workflow and to the end-user experience in terms of more convenient and professional development tools and a more efficient runtime.

Conclusion

The Sprego methodology to teach spreadsheet-management and to prepare students for further studies in programming and/or database-management in ICT education is already used in several high-schools and is a more effective method than traditional surface-approach low-mathability practices. It focuses on problem-solving and schema-construction to develop the students' algorithmic and computational-thinking skills while creating long-lasting knowledge. This methodology is supported with various unplugged or semi-unplugged tools to make the understanding of the algorithms easier. Among these tools we created an educational application to visually represent the most common Sprego problems the students encounter. In this paper we described a novel presentation of an inequality problem set in the context of an amusement park. We designed our new representation

based on the already implemented conditional counting algorithm, focusing on an authentic context that the students are familiar with.

Previously we have received positive feedback and experiences regarding the effectiveness of our application as used in classes. In the near future, we plan to conduct tests to statistically measure the effectiveness of using the application in Sprego classes.

Regarding the development roadmap of the application we aim to expand the available problems with further conditional summing algorithm representations. To help students of different nationalities working with Sprego to understand our application better and use it more effectively we plan to include more languages in addition to the two options currently available. Furthermore, we plan to switch to the new version of the underlying engine, Construct 3, to complete these development goals.

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References

- Anderson, D. L. (2017). Improving information technology curriculum learning outcomes. *Informing Science: the International Journal of an Emerging Transdiscipline*, (20(2017), pp.119–131).
- Angeli, C. (2013). Teaching Spreadsheets: A TPACK Perspective. *Improving Computer Science Education*, Routledge.
- Baranyi, P. & Gilanyi, A. (2013). Mathability: emulating and enhancing human mathematical capabilities. *4th IEEE International Conference on Cognitive Infocommunications*, (pp.555–558).
- Bell, T. & Newton, H. (2013). Unplugging Computer Science. *Improving Computer Science Education*, Routledge.
- Ben-Ari, M. (1999). Bricolage Forever!. *PPIG 1999. 11th Annual Workshop. 5–7 January, 1999*. University of Leeds: Computer-Based Learning Unit, UK. Retrieved December 01, 2016 from <http://www.ppig.org/papers/11th-benari.pdf>.
- Biró, P. & Csernoch, M. (2015a). The mathability of computer problem solving approaches. *6th IEEE International Conference on Cognitive Infocommunications*, (pp.111–114). DOI=<http://doi.org/10.1109/CogInfoCom.2015.7390574>.
- Biró, P. & Csernoch, M. (2015b). The mathability of spreadsheet tools. *6th IEEE International Conference on Cognitive Infocommunications*, (pp.105–110). DOI=<http://doi.org/10.1109/CogInfoCom.2015.7390573>.
- Biró, P. & Csernoch, M. (2017a). Unplugged tools for building algorithms with Sprego. *International Conference on Education and New Development*, Lisbon, Portugal, June 2017.
- Biró, P. & Csernoch, M. (2017b). Semi-unplugged tools for building algorithms with Sprego. *International Conference on New Horizons in Education*, Berlin, 2017.
- Chen, J. A., Morris, D. B., & Mansour, N. (2015). Science Teachers' Beliefs. Perceptions of Efficacy and the Nature of Scientific Knowledge and Knowing. *International Handbook of Research on Teachers' Beliefs*, (pp.370–386).
- Csapó, B. (2003). *The development of abilities and developing them in schools. In Hungarian: A képességek fejlődése és iskolai fejlesztése*. Budapest, Akadémiai Kiadó.
- Csapó, G. & Sebestyén, K. (2017). Educational Software for the Sprego Method. *The Turkish Online Journal of Educational Technology*, (INTE 2017 October, pp.986-999). Retrieved July 22, 2018 from http://www.tojet.net/special/2017_10_1.pdf. ISSN 2146-7242.
- Csapó, G. & Sebestyén, K. (2018). Sprego - Spreadsheet Lego. Retrieved May 30, 2018 from <https://play.google.com/store/apps/details?id=hu.sprego.oktatoprogram>.
- Csapó, G. (2017a). The ICT graduation exam and the text-management culture of computer-science undergraduate students. In Hungarian: Az informatika érettségi és az informatikushallgatók szövegkezelési kultúrája. *Válogatott tanulmányok a pedagógiai elmélet és szakmódszertanok köréből*. Retrieved February 09, 2017 from <http://www.irisro.org/pedagogia2017januar/85CsapoGabor.pdf>.
- Csapó, G. (2017b). Sprego Virtual Collaboration Space. *8th IEEE International Conference on Cognitive Infocommunications*, (pp.137-142). Retrieved January 31, 2018 from <http://ieeexplore.ieee.org/document/8268230/>. ISBN 978-1-5386-1264-4. DOI=10.1109/CogInfoCom.2017.8268230
- Csernoch, M. & Biró, P. (2015a). Computer problem-solving. In Hungarian Számítógépes problémamegoldás. *TMT, Tudományos és Műszaki Tájékoztatás, Könyvtár- és információtudományi szakfolyóirat*, (62(3), pp.86–94).
- Csernoch, M. & Biró, P. (2015b). Sprego Programming. *Spreadsheets in Education (eJSiE)*, 8(1). Retrieved July 21, 2016, from <http://epublications.bond.edu.au/ejsie/vol8/iss1/4>.
- Csernoch, M. & Biró, P. (2015c). Wasting Human and Computer Resources. *International Journal of Social*

- Education Economics and Management Engineering*, (9(2), pp.555–563).
- Csernoch, M. & Biró, P. (2018). Edu-Edition Spreadsheet Competency Framework, *Proceedings of the EuSpRIG 2017 Conference "Spreadsheet Risk Management"*. London, Imperial College, (pp.121–136). ISBN: 978-1-905404-54-4.
- Csernoch, M. & Dani, E. (2017). Data-structure validator: an application of the HY-DE model. *8th IEEE International Conference on Cognitive InfoCommunications*, (pp. 197–202). ISBN:978-1-5386-1264-4.
- Csernoch, M. (2009). Teaching word processing – the theory behind. *Teaching Mathematics and Computer Science*, (2009(1), pp.119–137).
- Csernoch, M. (2014). *Programming with Spreadsheet Functions: Sprego*. In Hungarian: *Programozás táblázatkezelő függvényekkel – Sprego*. Budapest, Műszaki Könyvkiadó.
- Csernoch, M. (2017). Thinking Fast and Slow in Computer Problem Solving. *Journal of Software Engineering and Applications*, 10(1). Retrieved July 08, 2017 from http://file.scirp.org/pdf/JSEA_2017012315324696.pdf.
- Csernoch, M., Biró, P., Abari, K. & Máth, J. (2014). Programming-oriented spreadsheet functions. In Hungarian: *Programozásorientált táblázatkezelői függvények. XIV. Országos Neveléstudományi Konferencia*. 6–8 November, 2014. Debrecen, Hungary.
- Csernoch, M., Biró, P., Máth, J. & Abari, K. (2015). Testing Algorithmic Skills in Traditional and Non-Traditional Programming Environments. *Informatics in Education*, (14(2), pp.175–197). DOI=<http://doi.org/10.15388/infedu.2015.11>.
- EuSpRIG (2018). EuSpRIG Horror Stories. Retrieved March 21, 2018 from <http://www.eusprig.org/horror-stories.htm>.
- IEEE&ACM Report (2013). Computer Science Curricula 2013. *The Joint Task Force on Computing Curricula Association for Computing Machinery (ACM) IEEE Computer*
- Kahneman, D. (2011). *Thinking, Fast and Slow*. New York, Farrar, Straus and Giroux.
- Kerettanterv (2013). Central curriculum framework for year 9-12 students. In Hungarian Kerettanterv a gimnáziumok 9-12. évfolyama számára. *Oktatáskutató és Fejlesztő Intézet*. Retrieved November 09, 2016 from http://kerettanterv.ofi.hu/03_melleklet_9-12/index_4_gimm.html.
- Merriënboer, J.J.G. van & Sweller, J. (2005). Cognitive Load Theory and Complex Learning: Recent Developments and Future Directions. *Educational Psychology Review*, (17(2), pp.147–177). DOI=<http://doi.org/10.1007/s10648-005-3951-0>.
- Microsoft (2018a). Excel functions (alphabetical). Retrieved July 30, 2018 from <https://support.office.com/en-us/article/excel-functions-alphabetical-b3944572-255d-4efb-bb96-c6d90033e188>.
- Microsoft (2018b). COUNTIF function. Retrieved July 09, 2018 from <https://support.office.com/en-us/article/countif-function-e0de10c6-f885-4e71-abb4-1f464816df34>.
- Microsoft (2018c). COUNTIFS function. Retrieved July 09, 2018 from <https://support.office.com/en-us/article/countifs-function-dda3dc6e-f74e-4aee-88bc-aa8c2a866842>.
- Microsoft (2018d). SUMIF function. Retrieved July 09, 2018 from <https://support.office.com/en-us/article/sumif-function-169b8c99-c05c-4483-a712-1697a653039b>.
- Microsoft (2018e). SUMIFS function. Retrieved July 09, 2018 from <https://support.office.com/en-us/article/sumifs-function-c9e748f5-7ea7-455d-9406-611cebc642b>.
- Microsoft (2018f). AVERAGEIF function. Retrieved July 09, 2018 from <https://support.office.com/en-us/article/averageif-function-faec8e2e-0dec-4308-af69-f5576d8ac642>.
- Microsoft (2018g). AVERAGEIFS function. Retrieved July 09, 2018 from <https://support.office.com/en-us/article/averageifs-function-48910c45-1fc0-4389-a028-f7c5c3001690>.
- NAT (2012). National Base Curriculum. In Hungarian: *Nemzeti alaptanterv. Oktatáskutató és Fejlesztő Intézet*. Retrieved October 22, 2016 from http://ofi.hu/sites/default/files/attachments/mk_nat_20121.pdf.
- Panko, R. & Port, D. (2013). End User Computing: The Dark Matter (and Dark Energy) of Corporate It, *Journal of Organizational and End User Computing*, (25(3), pp.1–19).
- Panko, R. (2013). The Cognitive Science of Spreadsheet Errors: Why Thinking is Bad. *Proceedings of the 46th Hawaii International Conference on System Sciences*, January 7-10, 2013. Maui, Hawaii.
- Panko, R. (2015). What We Don't Know About Spreadsheet Errors Today: The Facts, Why We Don't Believe Them, and What We Need to Do. *arXiv preprint*. Retrieved July 21, 2016, from <http://arxiv.org/abs/1602.02601>.
- Pólya, G. (1954). *How To Solve It. A New Aspect of Mathematical Method*. (2nd Edition 1957). New Jersey, Princeton, Princeton University Press.
- Scirra Ltd. (2018a). Create games with Construct 2. Retrieved June 22, 2018 from <https://www.scirra.com/>.
- Scirra Ltd. (2018b). Make Your Own Games - Construct.net. Retrieved June 24, 2018 from <https://www.construct.net/>.
- Sestoft, P. (2011). Spreadsheet technology. Version 0.12 of 2012-01-31. IT University.
- Skemp, R. (1971). *The Psychology of Learning Mathematics*. New Jersey, USA, Lawrence Erlbaum Associates.

- Soloway, E. (1993). Should we teach students to program? *Communications of the ACM*. (36(10), pp.21–24).
- Wakeling, D. (2007). Spreadsheet functional programming. *JFP*. (17(1), pp.131–143). Cambridge University Press.
- Wing, J. M. (2006). Computational thinking. *Communications of the ACM*. (49(3), pp.33–35). DOI=<http://doi.org/10.1145/1118178.1118215>.

Vocational School Students' Images Of Mathematics: Accounting Department Sample*

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Abstract

In this paper, we analyse the situation that what are the ways of finding of vocational schools of young students, children and people, if there is a relation between academic study level and determining the schools or is not a main factor, what is the creating of mathematical idea for vocational school students. This paper underlined regular research discipline research type with a methodological approach. The analyse way declined research design of Likert-type questionnaires for the account department student's selectin for this study from a vocational school in Turkey. A total 225 students were the study group of this study. The findings coming from this special school showed that there was a necessary and vital for a special curriculum program for students focusing on basic knowledge taught in their school and skills and organising the context of the mathematics curriculum applicable towards students' situation. As a result of this analyse, teachers face some important and tedious problems specific to the student group in their department in their school. They usually need to compose more applicable and more efficient schedules for working students in any special work area connection their school program or not. The school Atmosphere as imitated by students' own relation to learning in the classes area the views of the classroom, teachers' teaching, outlooks appears to be non-positive related item. All these necessities may not easy to determine an effective program for school administration. In this paper we have focusing some problems of student that need rectification in mathematics teaching program and learning level in the classroom. Finally we can say that specific teaching approaches of education and working life for vocational school students; focus on teaching for working students' to make more clear of basic knowledge and skills.

Keywords: vocational schools, mathematics, academic problems, students' beliefs

Introduction

Mathematics and all science disciplines are important and vital to the social life, economical conditions and, so progress of modern life a country for all time period of education. The teaching of accounting needs effective and powerful planning to make useful for students and ensure quality education system for the citizen of the country (Bakar at all, 2010; Kılıçaslan at all, 2018; Şeneldir at all, 2017b). While concerted necessities should be taken to educate the every body, we should not lover sight of the motivation of the vocational students. Learning mathematics in their program for vocational students is a phenomenon and interesting subject for some perspectives and does not often occur with clarity (Bakar at all, 2010)

Different factors and elements may cause to learning problems and understanding difficulties coming from student consultation level or motivation problems in mathematics for the students for their education life (Bakar at all, 2010). In all these items are: the scientific knowledge, mathematical language, symbols, difficulties and learning problems relating social conditions in processing mathematics, some visual confusions related to mathematics learning of students, and working life conditions memory and many difficulties, also unusually high anxiety in education life (Bakar at all, 2010; Şeneldir at all, 2017c; Valencia and Black, 2002). Understanding math for vocational students is a start point to feel attention and many schedules have designed learning conditions in all level of education environment which are more insprings even though the process of determining the difficulties of the problems come from all above factors are still at a uploading way (Bakar at all, 2010). Moreover, it is clearly pointed that there are specific needs, and all educational plans should be presented a real and long period of study by researchers ((Bakar at all, 2010).

Research studies for all education programs and especially vocational school education classes show that some difficulties in teaching strategies for learning mathematics are possible with low or much level in the classrooms (Bakar at all, 2010 Wheelage & Rutter, 1989). The all educational problem are, for example, insufficient points that students have relevant background basic knowledge for learning the lesson and rapid rate for introducing many of the concepts. Also, lack of logical level in the presentation of mathematics strategies in the classroom and poor communication and a lack of corporation activity in many instructional activities. Many authors mentioned this lack of motivation a basic negative factor in their studies. Moreover, insufficient teaching practice of teachers to help the students learning from the initial teaching level to make their teaching more effective and interesting to independent learning and insufficient analyse of their teaching periods to motivate them to students awae of that

* A brief version of this article presented at INTE 2018

what they have learned at the lectures (Bakar at all, 2010; Koparan at all, 2018; Of at all, 2017; Tola at all, 2017; Şeneldir at all, 2017a; Seit, 2004).

The instructional approaches recommended from mathematic education researchers that implementation of interesting students' learning and to motivate their student learning, understanding levels and learning styles (Bakar at all, 2010; Of at all, 2018; Kahraman at all, 2018; Ernest, 2004; Dalby and Noyes, 2015). Also, application of powerful and effective teaching targets (Battal at all., 2017; Bostan, and Durmuş, 2016; Bostan, and Durmuş, 2017; Durmuş, 2016). The underlined points in this research are:

- To define problems connect to mathematics learning of students
- To determine problems effect to the teaching and learning of mathematics
- To understand learning atmosphere for students in learning the subjects
- To formulate some effective teaching strategies that are known not efficient for the math teaching for this course teachers.

Method

It is used a quantitative, descriptive examination analyzing method, having accounting department students in a vocational school in Turkey. Vocational school students usually refer to students with future academic planning problems and low academic achievement. 225 accounting department students from 1st year and 2nd year class level was used for this study. The students answered two separate 5-point Likert scale questionnaires indicating their level of agreement to specified items in each questionnaire for learning mathematics (Bakar at all, 2010).

Findings

By using of the questionnaire, the data was classified and it was settled that much of the students were male about 60% and the other were female 40%. The classification level of students who had good level academic of academic exam point in the course exams or tests were not good level, mean that 18.41%. Moreover, with the interesting points of student level who passed the tests were not god level, most of them believe that Mathematics were lovable to stud and understand. Our data analyses result showed that approximately 11.0% of student respondents negative feeling for Mathematics (Table 1).

Table 1: Students observation on mathematics

Perception category	Mathematics	
	Frequency	Percentage
Enjoy	136	60.4%
Moderate	61	27.1%
Dislike	28	12.5%
Total	225	100%

Student perspectives that they presented during the search for their problems in learning the course especially that mathematics was being given theoretical way rather than computational algorithms. To learning the course, two problems were high level of percentage by ranking of the questions, by the expression of them in the question are, on their 'Difficulty to remember formulae' learned (77.2%) and 'Difficulty to remember mathematics content' (70.1%). The other problem of student connected to the learning of the course as presented in the following tabe, with the interested finding of the analyse a fe of the student data indicated that student faced with the problems, moreover a little percentage of the students had settled in the idea that they were faced these problems because of much of the students didn't showed the top level for problems as difficulties during their learning periods in their program. The data coming from the item 'students' 'dislike for mathematics', was the small level of student group stressed that that they don't fell positive thinking for mathematics (13.6%) (Table 2). All these finding are the same with the our main reference research team that they presented in their article (Bakar at all, 2010)

Table 2: Form two students' ideas for the problems that they faced in their learning program

Types of problems	Mathematics	
	Yes	No
Do not remember the formulae	77.2%	22.8%
Difficult to remember the math content	70.1%	29,9%
Do not understand the formulas	51.6%	48.4%
Mathematics is difficult	67.5%	32.5%
Do not know how to apply the formulae	46.3%	53.7%
Do not understand what teachers are teaching	56.8%	43.2%

Teachers change to new topics very fast	22.5%	77.5%
Dislike mathematics	13.5%	86.5%
Teachers did not give enough examples to answer the questions	10.7%	89.3%
Teachers did not repeat the subject	8.9%	91.1%
Teachers did not explain clearly	12.3%	77.7%
Teachers only asked to do the exercises on the white board	13.6%	86.4%
Teachers make us copy notes	9.7%	90.3%
We were given many problems as homework	8.3%	91.7%

Additionally, table 2 also explain students' feelings and approaches on problems they lived when they are learning mathematics. The main 5 items presented the data were up level by big percentage of the student approaches in all the questioner items of the scale, and 2 of these item up level cloase relation with the two item they faced during learning period by the basic item of the scale that 'Do not understand what teachers are teaching (56.8%), and their 'Dislike mathematics (13.5%). The rest 3 situation observed at the point that learning mathematics were by the reference the the reality which the participations 'Teachers did not repeat the subject (8.9%), 'Teachers did not give enough examples to answer the questions (10.7%), and that the they felled that 'Mathematics is difficult' (67.5%).

The accepting level to questioner items of students totally, they present positive attitudes for the learning conditions in their registered schools (Bakar at all, 2010). According to their basic points, the item which has the maximum level of coordination was 'Most of my teachers taught us with enthusiasm (mean=3.73). This finding give us when lo point students usually would attempt to reach the maximum score possible. Also, a positive answer on the way to the item 'My discipline teacher takes good care of students' (41.5% agreed). In a confident learning environment was produced to questionnaires items to several items, for example 'Almost all of my friends in my class tried to get the best score' (42.2% agreed). 'Teachers always want us to produce good work' (53.6% agreed), 'Students in my school integrate well among them' (52.2% agreed), and 'Most of my teachers taught us with enthusiasm' (41.7% agreed). Most of the finding in this step are less or more confident the result of our scale reference (Bakar at all, 2010). Generally, the findings showed that the students' feelings on the way to the learning enviroment of their schools was the direction of confident level (Table 3).

Table 3: Students' thinking according to learning atmosphere

Types of problems	Mean	Strongly disagree	Disagree	Agree	Strongly agree
I like my class	3.47	11.5%	19.6%	47.3%	21.6%
Students in my school integrate well among them	3.28	6.7%	15.2%	52.2%	25.9%
I tried my best to get the highest score	3.54	2.9%	11.4%	42.1%	43.6%
Most of my teachers taught us with enthusiasm	3.73	7.8%	12.2%	41.7%	38.5%
My discipline teacher takes good care of students	3.41	6.0%	16.7%	41.5%	45.8%
Almost all my teachers are good teachers	2.8	5.5%	22.5%	53.3%	18.7%
Teachers use many methods to teach	3.43	4.3%	17.6%	57.5%	40.6%
Teachers always want us to produce good work	3.21	5.8%	17.2%	53.6%	23.4%
Almost all my friends in my class tried to get the best score	3.13	3.6%	21.5%	42.2%	31.7%
A few students in my class interrupt while in teachers are teaching	2.98	10.9%	13.5%	47.6%	28.5%
My parents did not help me to be more successful	1.81	43.6%	35.8%	12.2%	8.4%
Students in my school take good care of the school property	2.42	27.5%	43.5%	22.9%	6.1%
Almost all teachers under-estimated my class	2.24	38.5%	37.6%	21.4%	12.5%
I don't like to study	1.69	40.6%	41.8%	11.5%	6.1%

I go to school not to study but to see friends	1.88	40.0%	49.5%	9.1%	2.4%
Discipline rules are not fair to me	2.43	25.1%	40.8%	23.7%	15.4%
My class was blamed when anything bad happened to the school	1.84	34.5%	35.7%	21.0%	8.8%
Teachers always use harsh words in the class	1.96	32.5%	41.6%	16.4%	4.5%
	1.88	35.4%	38.5%	20.0%	6.1%

Almost all teachers expected that we have no future

Result

With this study, it was tried to analyse vocational student feeling or perception against to their learning environment. The result connected to students' feeling of their learning atmosphere explain that most of students are confident or good level score way towards their learning atmosphere as the same the result of our scale reference (Bakar at all, 2010). More over, when items of question are related to students that showed to the negative feelings are detailed the study gave the result that meaningfully minimum level ability their explanations related to the abnormal expressions related to the maximum performance group of accounting department students.

The data give us that students focusing on basic knowledge and abilities and presenting a normal level the content of the mathematics lectures turned the way of students. Moreover, presentation for teaching and practice subjects should be get to students' motivation to their school life. Explicit teaching methods for students were suggested that give more concentration to teaching for the anaFlyse of their information and ability performance, teacher presentation with effective student's active positions, teachers be given additional pedagogical training for teaching of mathematics. Teaching mathematic to vocational school student should be given focusing with regards to school program and teaching approaches as expressed the same the result of our scale reference (Bakar at all, 2010).

Finally, it is recommended specific curriculum for accounting department students in vocational school that follow on basic knowledge and skills and consider the different learning abilities and styles of this students.

References

- Bakar, Kamariah Abu, Rohani Ahmad Tarmizi, Sharifah Md Nor, Wan Zah Wan Ali, Ramlah Hamzah, Arshad Abdul Samad, and Abdul Rashid Jamian (2010). "Teachers and Learner's Perspectives on Learning Mathematics for At-Risks Students", *Procedia - Social and Behavioral Sciences*.
- Battal, F. Durmuş, İ. ve Çınar, İ. (2017). The Effects Organizational Citizenship Behaviours and Decision-Making Styles on Transformational Leadership Behavior. *International Periodical for the Languages, Literature and History of Turkish or Turkic*, 12 (31), pp. 1-28.
- Bostan, S. ve Durmuş, İ. (2016). Yöneticilerin Karar Sürecinde Zamanı Kullanması Üzerine Bir Araştırma. *Journal of Administrative Sciences*, 14 (27), pp. 277-307.
- Bostan, S. ve Durmuş, İ. (2017), "An Attemp to Develop A Scale on the Decision Process: The Manager Decision Time Scale", *Hacettepe Sağlık İdaresi Dergisi*, 20 (2), pp. 125-141.
- Durmuş, İ. (2016). TV Reklamlarının Tüketicilerin Tutum ve Motivasyonları Üzerindeki Sosyo-Ekonomik Etkileri: Üniversite Öğrencileri Üzerine Bir Uygulama. *The Journal of International Scientific Researches*, 1 (1), pp. 28-40.
- Dalby, D., & Noyes, A. (2015). Connecting Mathematics Teaching with Vocational Learning. *Adults Learning Mathematics: An International Journal*, 10(1), 40-49.
- Ernest, P. (2004). Relevance versus Utility. In B. Clarke, D. M. Clarke, G. Emanuaelson, B. Johansson, D. Lambin, F. Lester, A. Wallby & K. Wallby (Eds.), *International Perspectives on Learning and Teaching Mathematics* (pp. 313-327). Goteborg: National Center for Mathematics Education
- Jan H. Van Driel, Onno De Jong Nico Verloo, (2012). The development of preservice chemistry teachers' pedagogical content knowledge. *Science Teacher Education*, Vol 86, 4.
- Kamariah, A.B., Rohani A.T., Sharifah M.N., Wan Zah Wan A., Ramlah H., Arshad A. and, Abdul Rashid, J., (2010). Teachers and Learners' Perspectives on Learning Mathematics for At-Risks Students. *Procedia Social and Behavioral Sciences*, 8(C), 393-402.
- Kılıçaslan, I., Aydın, S., Türkeri, K. and Soydaş, H. (2018). Attitudes towards Online Web Assisted Learning: Accounting and Tax Students. *The Online Learning of Distance Education and e-learning*, 6(2), 27-33.
- Koparan, B., Akça, Ü., Köş Aydın, F. and Aydın, S. (2018). On the Attitudes of Construction Technology Students towards Information and Communication Technology. *The Online Learning of Distance Education and e-learning*, 6(2), 67-73.

- Seita, J. (2004), Strength-based Approaches Expand into Leadership, *Reclaiming Children and Youth, Vol. 13* No.1, 22-5.
- Şeneldir, O., Soydaş, H., Genel, Y., Akça, Ü., Kudu, M. And Aydın, S. (2017a). Emotional and Social Intelligence Against Inertia. *Turkish Online Journal of Educational Technology, SI*, pp.229-234.
- Şeneldir, O., Kudu, M. Genel, Y, Akça, Ü., Soydaş, Aydın., S. (2017b). Types of Behavior in Businesses and Resistance to Individual Change. *Turkish Online Journal of Educational Technology, SI*, pp.843-848.
- Şeneldir, O., Aydın, S., Kudu, M., Kılıçarslan, İ., Of, M. & Mutlu, C. (2017c). Kaizen and Intuition in Stress Management. *The Turkish Online Journal of Educational Technology, SI*, pp. 345-349.
- Tola Y., Aydın S., Şeneldir O., Mutlu C., Koparan B., Of M. (2017). Meslek Yüksekokulu Öğrencilerinin Memnuniyet Düzeyleri Üzerine Bir Araştırma. *Turkish Online Journal of Educational Technology, SI*, 607-610.
- Valencia, R., Black, M (2002). “Mexican Americans Don’t Value Education! The Basis of the Myth, Mythmaking, and Debunking”, *Journal of Latinos and Education, Vol. 1 No.2*, pp.81-103.
- Wehlage, G.G & Rutter, R.A (1986). Dropping Out: How Much Do Schools Contribute to the Problem? *Teachers College Record. 87(3)*, available at <http://www.tcrecord.org/PDF/660.pdf>

Wrestling with the Future in Vocabularies of Tradition: The New Entrepreneurial Subject of the Postcolonial Elite School

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Abstract

“Given the socio-cultural structure of post slavery Barbadian society, this invariably meant some sacrifice of the essence of negritude, of what it meant to be quintessentially Black and African. Similarly in an age when for most Blacks formal schooling was the main avenue of social mobility and the Established Anglican Church, the bastion of social privilege, to internalize collective norms and values of the Grammar School and the Established Church was to improve one’s chances of achieving upward mobility from the working class.” (Jemmott, 1998, p. 48).

Even now...like my uncles...my mother...they are asking me...well, when are you applying to Harvard....Oh, next year you will be going to Yale.... So, these are my expectations and I just live up to it...I have a cousin who went to Harvard at age 15.....(Ashley, Sixth Form Student at Old Cloisters High School, Barbados)

Introduction

The story I am about to tell of Barbadian Postcolonial Elite Schooling is a story paradoxically about a group of working and lower middle-class youngsters who embrace excellence as a pure line vehicle to middle class futures. It is a story of aspirant subjects in an aspirant nation, an aspirant island. It is a story written against methodological nationalism and rooted in the existential transnationalism that defines the modern history of the island from its founding in British 17th century colonial expansionist trajectory in the region. In telling the story of findings of ethnographic research on “Barbados Elite Schools in Globalizing Circumstances,” I begin with a satirical quote from Regent Jeffrey— a white alumnus of one of the two schools I am studying there, Old Cloisters (the other school in the study is called Ardent Arbors)—on the occasion of the school’s 250th anniversary. Regent Jeffrey’s mock serious quip inverts the liquid commonsense of the “tourist/vagabond” motif that Zygmunt Bauman argues is embedded in the globalization discourse of late modernity (Bauman, 1998): “Barbados got the most talented and intelligent African immigrants, and the most intellectually backward deportees from England, Scotland and Ireland...Over the years we whites have been content to get kicked out of school around third form, run businesses, fornicate, drink rum and use language laced with expletives leaving the intellectual side of things to our more erudite black brethren” (Jemmott, 2006, p. 159). Let’s establish Regent Jeffrey’s mischievous comments as a place marker of sorts in the swiftly shifting sands of the new century. Besides, Jeffrey’s quaint attachment of prestige to the vernacular, his elevation of the vulgar gaze as symbolic capital, and his re-scripting of Pierre Bourdieu’s inventory of dispositions or habitus, what is important here is that Jeffrey’s comments allude to the making process of the island’s intellectual class, its transnational character, and in our interested case, the recruiting of post-C. Wright Mills elite ethical subjects from deep within the subaltern classes of Barbadian black labor. [These are the subjects that V.S. Naipaul tells us in his books *Middle Passage* and *Half A Life*...are “halfmade”] The postcolonial scenario of the worlding of elites is one not of class reproduction, therefore, so much as of class making. This then leads me to a larger starting point. That is that, any examination of the interface of education and globalization with respect to what Aihwa Ong and Saskia Sassen call “post- development states” such as India, Argentina, Singapore, Hong Kong, South Africa and Barbados—whose elite schools are the focus of our international research collective — must be voiced in a postcolonial timbre (Ong, 2006; Sassen, 2008). That is to say, that the coordinates at this intersection of dynamic worlding processes must be set within the long durée of the project of modernization and the aspirational riddle of modernization theory in particular—From Juan Ginés de Sepúlveda and Bartolomé de las Casas’s debate on the question of does the native have a soul? to the neo-soul of Rihanna, Cover Drive, and the new aspirations of Barbadian youth hitching a ride with their school diplomas to Christopher Lasch’s North America as the “one and only true heaven.” In this presentation, I take a distinctly Benjaminian approach, drawing on his insistence in his discussion of the Janus nature of Paul Klee’s haunting painting, *Angelus Novus*, that the past buffets the present. There is he said “a storm in paradise” (Benjamin Year and page)...This storm maybe in the case of this study the

roiling ambitions of the Barbadian young, juxtaposed to the powerful traditions in their school system inherited as it is from the British metropolitan paradigm.

The modernization project as it bears upon education in Barbados has a strong existentially transnational character. In what follows, I briefly outline the transnationalist history and context to elite schooling in the island, always with this long relief of modernization thinking in mind. Because, following Arjun Appadurai's essay "The Spirit of Weber," under neoliberalism the modernization project has been transformed from a proposed policy initiative of socially caring emerging TW states into something else: the work and care of the self articulated chiefly in the adventurism and the risk taking of the young. It has become as Madhavi Murty ("It's True, India Has Emerged": Gender, Class, and the Entrepreneurial Subject in India's Mainstream Media) suggests the project of the entrepreneur—the new heroic figure rising from the ashes of the collapsing Keynesianism of welfarist states. I discuss the schools in light of this. I introduce some of the students as exemplars of new neoliberal calculations—representatives of the spirit of enterprise. And, I draw some conclusions bearing upon what the venerable geographer, David Harvey calls "ruptures with continuities."

History as Context

Barbados from the very beginnings of its modern British colonial settlement in 1627 has always been an island defined by powerful processes of absorption and expulsion. The logics of this are rooted in its precarious but steely economic existence, its particular race/class configuration, its peculiar insertion into the global economy as a plantation/post-plantation society, and the compensatory and the muscular aspirations of its people articulated most poignantly, deep inside its gentrified, largely landless, working class. This has meant—despite its historical and popular depiction of continuity, relative economic prosperity, solidity and cultural conservatism—continuous diremption, mobility and a pragmatic transnationalism, circulation and extension of its population. It has meant the movement of labor from Birmingham, Liverpool, Dublin (<https://bimchat.wordpress.com/tag/ireland/>), later from Africa, India, China and the continuous circulation of population across the islands of the Caribbean sea, to the South American Continent, to England and North America. This is captured in novels such as George Lamming's *The Emigrants*, V.S. Naipaul's *The Mimic Men*, Samuel Selvon's, *The Lonely Londoners* and Jamaica Kincaid's *Lucy*. Lamming's *Emigrants*, for instance, foregrounds the motley crew of cooks, masons, and transportation workers from all over the Caribbean, along with intellectuals like Lamming and Naipaul, leaving for England on the same ship, the Empire Windrush, in the 1950s. The foundations of this mobility (real and vicarious)—residing in matters of its constrained space (a tiny island of 166 square miles) and its relative lack of natural resources—has often meant a fundamental investment in the care of the self as the only viable means of production available to the property-less working class. The is class that the Cloisters school historian, Rembrandt Simmons, calls the gentrified working class—defined by the home-school-church nexus, a taste for light classical music, old country and western songs...Jim Reeves, Marty Robbins, Charlie Pride ...and the whole venue of slow music, a rigorous investment in the law and an insistence that the law be followed. A significant dimension of this working class expression of the care of the self has been linked to an existential cosmopolitanism and outward movement. Significant elements of its population have always anticipated movement, even as its relative prosperity and regional ascendancy has meant the migration of peoples from other Caribbean islands to it. This movement has been polyvalent—within the Caribbean region, to the US, Canada and the UK, to Europe, Latin America. And, increasingly China, Singapore, etc have become points of reference. As Claire Livingston, curriculum leader at Old Cloisters, told me in our interview: "There is a saying: 'You can find a Bajan (a Barbadian) everywhere, even on the moon.'"

This framework of liquid global connections, forces and imaginations—the Burawoyian parameters that inform our research exploration—melt and flow into each other in the lived and commodified existence of real existing subjects of the Old Cloisters school we are studying in Barbados. The Barbadian educational system was profoundly externalized from its very beginnings in the seventeenth and eighteenth centuries. Old Cloisters and Ardent Arbors were historically exemplars of the British grammar school transplanted overseas. All of Cloisters headmasters, right up until almost the last quarter of the twentieth century came from Oxford or Cambridge and the schools' faculty came out of the British elite public school tradition to spawn a high stakes, high achievement culture in the island (show a list of these headmasters and their public school origins). The Barbados educational system was therefore hooked up to the British educational system, with a sponsored minority ending up in Oxford and Cambridge (The Mitchinson Report, cited in McCarthy 1983, p. 205).

But we now were entering a research context in Barbados at a flashpoint of profound change and disruption of the British grammar school model as the forces of globalization, the downturn in the global economy and the emergence of the post-development state (Barbados has set 2020 as the date when it expects to transition into First World developed status), the expansion of the media environment dominated by American cultural form, and the

ubiquitous access to cell phones and the internet that define the everyday life of the young, have generated new rambunctious aspirational and entrepreneurial desires and imaginations for exotic career futures within the contemporary youth communities that exceed the capacities of the school and the nation. This has resulted in strategic action on the part of students reflected in new curricular choices (management of business, information technology, computer science, law, economics, accounts, communications studies, Spanish are displacing the traditional liberal arts subjects of history, geography, Latin, Greek, etc and the complete demise of the classical sixth form around which the School had built its identity as a school of extraordinary academic excellence) parked alongside the old liberal arts emphasis that constitutes historical bequeath of these schools .

As Ardent Arbors and Old Cloisters' students turn their gaze towards futures beyond the island, reciprocal developments of great import are occurring. New aggressive recruitment drives are being launched by universities and elite high schools in the US and Canada targeting academic talent in Barbados (<http://www.nationnews.com/articles/view/universities-eye-local-students/>). This reciprocal investment—precipitated by a metropolitan generated opportunism underwritten by the new priorities of NAFTA and WTO to externally integrate third world economies (inclusive of services such as health and education) into the global system—has brought the phenomenon of the annual International College Fair showcasing US, Canadian and UK universities and colleges onto the Barbadian setting fomenting new powerful desires in Barbadian school youth for something that their schools cannot satisfy.

This hard court press on the Barbados elite schools was corroborated by Judith Pim, guidance councilor at Ardent Arbors, who informed us that: “We have a College Fair every year in Barbados and a number of universities from within the Caribbean, US, Canada and England are in attendance. However most of them, if not all, try to get a special visit to our schools. That I can remember now—Canada...Waterloo, Queens, Western Ontario, Humber/Guelph, St. Mary's, York, University of Toronto—these come about every year. A rep from Waterloo has come in and done a workshop for me on 'Job Preparation,' actually we will meet-up later in the month for a send-off for the students going this year.” The International College Fair and the recruiting practices of the international universities and colleges help set up and bolster the powerful drive of Ardent Arbors and Old Cloisters students to look to a future outside of Barbados.

These developments have set off powerful configurations of needs, interests and desires and reflect themselves in extraordinary juxtapositions and hybridities. The British grammar school tradition is evident as a powerful imperial symbolic that materially dwells within the zone of reference that Basil Bernstein calls a “restricted code” (1977, p. 4) of school uniform, emblems, flags, school songs, and the ritual of time—Michaelmas Term, Hilary Term and Trinity Term—old ways of ordering the school world that have disappeared elsewhere. There is evidence of these colonial condensations everywhere. The students clearly embraced this sense of tradition and saw their schools as markers of distinction that also helped to define them as unique and different and “elite.” But at the same time, these students are not orienting to England in the ways of the past. They are orienting to North America and increasingly also to China, which now has committed itself to providing 5,000 scholarships to students in Caribbean and Latin America. Students are therefore pursuing two parallel curriculums: often the schools' liberal arts/humanities collection code as well as their neoliberal calculative project defined around business studies. Elements of this parallel, neoliberal curriculum were often pursued outside the school as several of the students attended “lessons” with “master teachers” in their particular chosen subjects of study.

Most of the students we interviewed expressed a strong interest in entrepreneurship. One student, Ginger, going so far as to indicate that she wants to found a magazine because this would allow her to combine her interest in writing and the creative arts with her interest in business:

CM: Now as you kind of think about your schooling and...your future ...is this informing how you are taking your school subjects?

Ginger: Well I do management of business, economics and literatures of English...When I got into sixth form I chose...I want to work at a Magazine and eventually own my own...So then I chose business to go with that and... literatures in English....

M.M: ... Why the push to business...how then to business now?

Ginger: Because business...business...well business basically rules the world!

It is this powerful discourse of entrepreneurialism that suffuses the air in the nation's popular, in the newspapers and electronic media, in the language of politicians and the speeches of government leaders and cheerleaders of the young. And, at Old Cloisters and Arbors Ardent youngsters are making the rational calculations that the venue that would support entrepreneurial activity is not, Barbados but somewhere “abroad.” The idea of making something from nothing, of creating a new productive activity drives these young imaginations. As, one

student at Ardent Arbors (Megan) noted: “Globalization is big!” Megan felt that the island and the schools have been overtaken by the speed and force of these changes:

CM: We were talking about globalization and were wondering if you had thoughts about that...we are interested in how young people are being prepared for globalizing futures...

Megan (with her friends Kelvin, Alistair, Abigail and Safiya): It (Globalization) is big now...We talk about it a lot in our classes because the Caribbean is very susceptible to it...as a small... as a number of very small open economies with the influx of all of these foreign goods...they are talking about the effect on domestic producers....different things are happening in the world...the taxation on the airfares ...the effect that it is having on our economy....the recession in the other countries....

CM: So what you are articulating is that globalization is being experienced as a kind of vulnerability of the region and its economies and Barbados in particular...

Megan: ...Before we use to have our preferential markets, you know, our exports... but things like that are disappearing...Because there are some people who don't see it [the challenges and the decline]...I am talking about adults here. I am like how can you not know this?

In response to this sense of the overwhelming challenge of globalization some students like Kelvin felt, more positively, that globalization offered opportunities. “It” was “useful... because it exposes us to different cultures.” Kelvin saw globalization as offering a world of convergence and online community: “you get to learn a lot.” The “world” he believed was available in the BlackBerry revolution:

Kelvin: Because right now, right now, I am kind of losing my grades in Spanish [laugh]... and I actually have a Spanish friend in Mexico and every now and then she would help me to revise and stuff...

MM: So, she is a native speaker?

Kelvin: Yes...

CM: And you are in touch with her ...How? ...Through Facebook?

Kelvin: Skype and basically everything else...

MM: How did you meet her?

Kelvin: Well....it was basically on an online game...

Not all Old Cloisters or Ardent Arbors students want to be entrepreneurs. A few of them like Blaise Pascal or Floyd Pitts see their peers as “sheep” (Floyd Pitts) who are blindly following “what is on television” and “online”...Pitts maintained that he was not part of the “BlackBerry” revolution. Neither was he overly taken by tertiary education in North America. He felt, that except for universities like Harvard, a good liberal arts degree from the University of the West Indies was “equal to any abroad.” His colleague, Blaise Pascall at Old Cloisters, was even more critical of his peers and their quest for lucrative professional futures:

Blaise: I do have to commend the staff of the institution. They are very devoted...But I do think that there is still the emphasis, the enduring emphasis...probably since colonial times...especially since education is seen as a tool of social mobility and we have this uh...this drive to become doctors and medical doctors and lawyers and what not....it has become really like an oversaturation of those in job markets now...every street you see in Barbados ...there is always such and such attorney at law...we really do have this drive for technical-scientific subjects...everybody in my class...I don't know... I find them really irritating... “Oh I want to be doctor”...Good...really unique!

MC: Why do they want to be a doctor?

Blaise: Because if they told me they wanted to help people then I would be a little more interested but...everybody knows it is the money...Because if they were really concerned about helping people, they would join something like Médecins Sans Frontières..They are not concerned with helping people. They are concerned with the very lucrative profession that it is.

Students like Blaise at Old Cloisters and Megan at Ardent Arbors, who articulated such a keen sense of the challenges facing their school and country, were attending the three-day International College Fair, held at the Sir Erskine Sandiford Sherbourne Convention Centre with a keen sense of curiosity and optimism even when they were skeptical. There, they talked to recruiters from North America about prospects and possibilities of job futures in areas that range from underwater welding to robotics, artificial intelligence, control engineering and business to theater and comedy— exceeding the establishment curriculum taught in the school. In other words, students at Old Cloisters and Ardent Arbors were wrestling over their futures as they both embraced and struggled with the symbolic layers of tradition that defined their school pasts, and of which they were the current custodians. They were also wrestling with the wider society, as well, which they saw as overtaken by events and a block to their aspirational desires:

Blaise: The problem we are having now is that because the orientation of tourism [to eco tourism]...I find Barbados itself is not really competing....

This perceived sense of the limited range of options informed the encounter between students and recruiters. Students were seeking new avenues and futures that they felt could be realized at the universities in North America. Recruiters told us that it was better to talk to the students without their parents because the parents still wanted the traditional career paths—doctors and lawyers. The encounter with recruiters, then, was a well-managed collusion among students and recruiters and the school personnel who recognized that these universities offered the promise of material futures for their students. I have discussed this rendezvous of stakeholders elsewhere...Given the constraints of time I would like to conclude and summarize here.

Schools Ancient and Modern: Old Cloisters and Ardent Arbors

In our many visits to Old Cloisters and Ardent Arbors grammar schools in Barbados, we were struck by one overwhelming and persistent feature. These schools wrapped up like the island itself in myths and traditions deeply rooted in a British colonial restricted code of ritual, distinctive emblems, school flag, distinctive school uniform and a pyramidal structure of authority going back to the seventeenth, eighteenth and nineteenth centuries were now caught up, despite themselves, in a swirl of change linked to globalizing pressures, national and regional imperatives, and the dynamic global imaginations of school youth. To understand this change from the perspectives of actors and stakeholders (students, teachers, parents, policy makers, politicians, business community, etc.) within the school and without, one must attempt to understand something of the long relief of the past of these schools (which still plays into the present) and the way a key variable that animates our research investigation, “elite” has overtime come to be redefined. Both Old Cloisters and Ardent Arbors were schools that were founded to promote the education of white youth (boys in the case of Old Cloisters; girls in the case of Ardent Arbors) who could not afford the exclusive education overseas in England (Eton, Harrow, Rugby) or in the United States (William and Mary). But these same schools would quickly become the preserve of fee-paying planter/mercantile elites who saw the schools rise in status as educational institutions of excellence. One only needs to look at the photographs aloft on the walls of the school halls [show pictures of these]. Every single school principal, right up to the early part of the post independence era came from England. The school pictures also foreground, during this long durée, a preponderance of planter mercantile youth. But on our research visit, visible and embodied evidence of change was everywhere registered: the schools’ principals, the teachers, the students, its key stakeholders were now Afro-Barbadians. This transition—we were told in our interviews with students, principals, teachers and critical analysts outside the school—did not happen by some process of natural attrition of Barbadian local whites but reflected a mix of Fabian socialist educational and social policy interventions pursued by the first Prime of Minister of Barbados, Errol Walton Barrow in the early 1960s and consolidated thereafter. These policies aimed at expanding access to the grammar schools to “all Barbadians” (Stuart Calmley at Old Cloisters) based on competitive exam results (scores in the Common Entrance Exams) as part of policy agenda of universal secondary education. This policy opened the floodgates to lower and middleclass black youth on the island. Old Cloisters and Ardent Arbors are emblematic markers of this policy of meritocratic re-orientation of the schools. But Barbados is now entering a new phase that might be called post developmental. There is a strategic engagement with globalization and neoliberalism in terms of the vaunting of entrepreneurship as the means-ends rationality of all institutions, which has now entered these schools. Old Cloisters and Ardent Arbors therefore represent uneven, contradictory, conflicted and hybrid institutions animated by the nodal discourse of globalism, cultural heritage linked to England, national assertion that articulates a useable Africanism and diaspora discourses, regionalism and externalist globalist imagination of young fueled by the cell phone, the internet, popular culture and the mass media.

We found that “eliteness” at Old Cloisters and Ardent Arbors was an investment in a plenitude qualified by the gap between aspirations and real existing conditions and resources. Cloisters and Arbors were schools marked by the play of contradictions and haunted by what Harry Harootunian calls a pregnant past.

- There was a powerful discourse of meritocratic justification that effaced race and class. The principals, teachers and students all maintained that it was “ability” and success in the steeple chase-like Common Entrance Exam that determined admission into the school. These schools were sites of disavowal of stratification of any kind, to use the language of Hommi Bhabha and Edward Said. Old Cloisters’ principal, Stuart Calmley, noted: “we have students from every strata.”
- These schools—which were overwhelmingly white, planter mercantile class up until the middle of the 20th century—are now overwhelmingly black, with a sprinkling of Indian, Chinese, and white students, the children of expatriates and multinational corporations.

- We found surprisingly that these students—who saw themselves as the best of the best— were often the children of masons, carpenters or police officers along with children of the professional middle class—lawyers, doctors and financial consultants.
- We did not find any children of the white planter mercantile class...There was a sense that these children were going to other schools, often private schools...one like Codrington High which we made a brief visit to and found children there represented from about 50 different nationalities.
- Old Cloisters and Ardent Arbors are schools defined by high academic achievement but this achievement is tied to a strategic set of actions and orientations of the students that, in the language of Tom Cross, an alumnus of Old Cloisters is undermining the ethos of intellectual cultivation that defined these schools in the past.
- This strategic action was reflected in new curricular choices that are displacing the old liberal arts curricular emphasis. Students were choosing such curricular subjects as business, economics, law and accounts and communication studies...instead of literature, history, geography, and mathematics. They are strategically putting together courses with the goal of pursuing professions in business, accounts, law, medicine etc.
- Both schools are also feeling the pressure to sustain their traditions in the context of new student orientations and central government pressure for the schools to participate in reproducing the new type of school subject that will better fit into the new Caribbean and the world, the new desire to orient to creative knowledge economy.....
- While this is the case, Old Cloisters which is located in the urban center seems to be struggling more with this change than Ardent Arbors where the principal, Kent Greene, who has two or three management degrees, is leading a strategic reorganization of the school. Ardent Arbors now competes in international exam competitions organized by the University of Waterloo in Canada among other things. Greene also runs professional retreats for his faculty in educational law, management, as well as first aid. Indeed, Ardent Arbors offers courses such as law and economics that students at Old Cloisters are choosing to take.

Conclusion

Forget the brain drain – today’s highly skilled migrants circulate between the US and developing countries, creating new technology businesses and spreading prosperity along the way. (Anna Saxenian, http://people.ischool.berkeley.edu/~anno/Papers/IMF_World_Bank_paper.pdf)

In her extraordinary essay, “Higher Learning in Global Space,” Aihwa Ong (2006, pp. 139-156) usefully observes that the North American university has become the grand bazaar, the great global marketplace, for international students from around the world in pursuit of globally valid credentialing and careerist futures. The university has been, in her view, disoriented from its endogenous role of preparing young people for citizenship within the US democracy and national space. According to her, the North American university has re-engineered its mission towards capturing substantial market share of the trans-border population of the worldly, upwardly-mobile and rationally-calculative young citizens increasingly leaving the Global South to seek their fortunes in the United States or Canada. The thrust of Ong’s writing in this fascinating essay is on the transformations, in light of these developments, occurring in US higher education. What the Barbados elite schools study illustrates is a reciprocal action on the part of the gentrified working class students who now turn away from traditional attachment to England and from unqualified nationalist affiliation and identity given their deep-bodied aspirational quest for educational and professional futures in North America. Here, we are ever mindful of the fact that the global ambitions of Barbadian youth are part of a larger set of processes linked to the revivification of modernization as a project that does not simply involve structural and economic processes but also practices of the care of the self that have a long historical backdrop in countries moving out of colonial pasts. Such processes of self-transformations linked to institutional change in the postcolony are often marked by disjuncture, contradiction and hybridity. The aspirational element of working class behavior as Schielke has told us in his brilliant essay on Egypt (“Living in the Future Tense: Aspiring for World and Class in Provincial Egypt”) is expressed in a new desire to breakaway entirely from the state apparatus that supported the old middle class tied to the elaboration of third world bureaucracy. Aspiration expresses itself in a lack— a pervasive sense of pressure on existential postcolonial lower middle class and working class subjects for a middle class respectability and material fulfillment—a semiotically bolstered dream of a plenitude that never comes and whose shadow side is an empty, unfulfilling debt-driven consumption represented in the North American middle class life. The Barbadian elite school subjects in this tale see their academic success and attainment as the only possible guarantee of access to this imagined life. Their idol then, their ambition as they tell it, is not to touch the garment of the heroic national transformer symbolized by the politician, the lawyer and the

doctor of the past...but to embrace the new figure of the entrepreneur who can turn water into wine....Schooling is thereby stripped of its sui generis meaning.....No student seemed interested in the toil of the teacher or the academic...who now fall steadily beneath their gaze.

References

- Bauman, Z. (1998). Globalization: The Human Consequences. Cambridge, UK: Polity.
- McCarthy, C. (1983). 1983 Imperial Involvement in Popular Education in Barbados 1833-1876. Edmonton, Alberta: M.Ed thesis.
- Ong, A. (2006). Neoliberalism as Exception: Mutations in Citizenship and Sovereignty. Durham, North Carolina: Duke.
- Robinson, W. (2004). A Theory of Global Capitalism: Production, Class, and State in a Transnational World. Baltimore, Maryland: John Hopkins.
- Sassen, S. (2008). Territory, Authority, Rights: From Medieval to Global Assemblages. Princeton, New Jersey: Princeton.
- Sklair, L (2009) The transnational capitalist class: theory and empirical research. In: Sattler, Friederike and Boyer, Christoph, (eds.) European Economic Elites: Between A New Spirit of Capitalism and the Erosion of State Socialism. (497-522). Berlin, Germany: Duncker & Humblot.