

Electronic Continuous Professional Development (E-CPD) for Teachers: Bridging the Gap between Knowledge and Application

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ABSTRACT

The continuing professional development (CPD) is a concerted effort to ensure the educational service officers to equip themselves with professional knowledge, skill, values and practices of teachers through in-service training program organized based on competency development, lifelong learning and career path. Nonetheless, educators do not only teach or lecture but also have other stipulated duties such as involvement in research, committees and administrative duties. All these activities are time consuming and to achieve a proper balance will be a great challenge for educators. Thus, an online training system, electronic Continuous Professional Development (e-CPD) was designed to provide training for primary school teachers virtually. This study aims to identify the activities that occur at every level of Bloom Taxonomy with the integration Zone Proximal Development (ZPD) activities in e-CPD. Qualitative methodology specifically content analysis was utilized during the data collection. The content of e-CPD was analyzed searching for the activities in relation to Blooms Taxonomy embedded in ZPD. The findings of the research indicated that the e-CPD system implemented the four levels of mentoring; coaching, self-coaching, fossilization and applications. Apart from that, the system also involved the teachers with the six levels of Blooms Taxonomy; knowledge, comprehension, application, analysis, synthesis and evaluation. The incorporation of Blooms Taxonomy bridges the gap between the teachers' knowledge and its application. Hence teachers are able to apply their learning to authentic workplace situations to improve on-the-job performance.

INTRODUCTION

Some researchers say mentoring can only be done by face to face so they can see their mentor (Evans & Volery, 2001). However, e-mentor is especially effective when there is no opportunity for mentors to mentoring traditional which is, face to face (Single & Single, 2005). If there is an internet connection, mentoring will be the choice of a national and international where it is very beneficial for people who are unable to access mentoring opportunities (Kasprisin, 2003), although it may involve additional costs and time. (Single and Single 2005) agree that e-mentoring is not saving time or a cheaper option to traditional mentoring, such as setting up Web sites and software programs but it can be an expensive consultation process and takes time.

But, e-mentoring is also able to overcome the constraints of time by allowing flexibility in the information; and communication independently (Kasprisin, 2003; Stewart, 2006). For example, e-mail can be read, considered and we can respond on time by allow appropriate reflection and constructive feedback. Restraint social status, physical appearance and behavior are not present in electronic communication, which in turn encourages disclosure will occur in communication face-to-face (Bierema & Merriam, 2002; Knouse, 2001; Stewart, 2006). It may be easier to store e-mail messages than words by face-to-face talk, which can lead to problems in communication. Mentoring which is traditionally not has additional signals such as body gestures and non-verbal communication. Instead, the e-Email provides a permanent record that can be returned for further reflection (Kennett, 2006). Technological developments, particularly increased the access to the internet among all levels of society, e-mentors (known as e-mail mentor, mentoring online, telementoring, and mentor e-CPD) has become famous in recent years (Cravens, 2002; Miller & Griffiths, 2005).

In addition, CPD training and e-learning should have key features such as following (Jamaluddin, 2000); transmission system and manage course material, access control-usually using a password, assessment of performance which monitored participants, collection and analysis of scores, track record of participant, system-level communication as inconsistent (asynchronous) and consistent (synchronous) face to face; one to many or the other round and many to many (such as through video conferencing), facilities timetabling of teaching and learning, formative assessment-shaped (self-assessment), storage space for students to exchange and store materials / data, resource base of teaching and learning materials are flexible, facilities support and help guides online, tool or facility to update the materials, tutor support or adviser, structure-in-class with e-CPD but there should be collaboration, mentoring, projects and portfolio preparation and progress of learning tasks effectively, term of a course or learning-not for a lifetime : It should however be flexible and cost of payment for course fees / program: fee e-CPD mentor and phone bills.

RESEARCH FRAMEWORK OF e-CPD

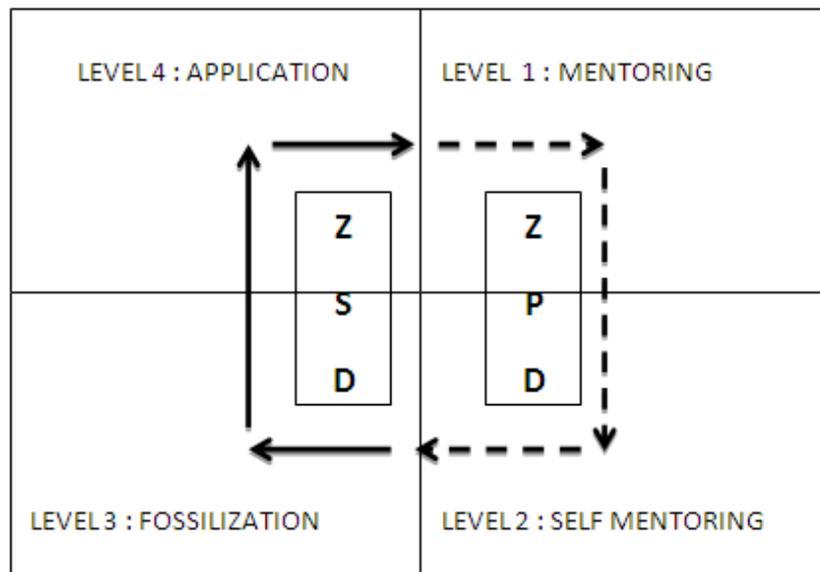


Figure 1: Theoretical framework of mentoring system based design in e-CPD

(Sources : Vygotsky, L.S. (1978). *Mind and society: The development of higher mental processes*. Cambridge, MA: Harvard University Press.)

Conceptual Framework of e-CPD is designed adapting Zone Proximal Development (ZPD) proposed by Vygotsky. The design of the system is intended to provide guidance for teachers who participating in virtual training in ICT skills of certain level so that they can manage their own learning at the next level.

Based on Vygotsky's (1978) an individual can come up with something or make their own designs in the future if they have guidance from someone. Vygotsky's theory differs from Piaget's theory which simply states that the behavior Human influenced by society. Vygotsky explains that human behavior is built through transformation and collaboration which influenced by culture, faith and other individuals (Vianna, 2006). ZPD is "the gap between the original development involving problem solving skills by self guided by someone or collaboration with skilled peers (Vygotsky, 1978). In other words, the meaning, ZPD is a zone where the skills cannot be mastered by an individual and requires guidance of a skilled peer or an expert (Woolfolk, 2000).

There are 4 levels in this conceptual framework. Level 1 and Level 2 involve "Zone Proximal Development (ZPD)" in this conceptual framework. Level 3 and Level 4 involves "Zone Self Development (ZSD) ". All of the works in the form of a cycle whereby every time teachers will be guided when a new skill is taught or introduced to them. Mentors play an important role in every cycle of this level. Cycle is shown by the arrows perennial and normal arrows. Perennial arrows represent significant guidance provided by the mentor. Normal arrows shows independent learning style which is supervised by a mentor. Thus, the overall mentor plays an important role in every level of activity.

Level 1 is the level of coaching whereby mentors will guide and assist teachers in primary schools to implement a virtual assignment. Mentor will play an important role in helping to solve the problems faced by teachers in the

design. Continuous communication and proper guidance are essential components of a successful mentoring relationship. It will start mentoring relationships, setting and monitoring of professional goals in helping participants ICT skills training (Portner, 2002).

Level 2 is the level of self-guidance. Elementary school teachers are required to solve the problem independently based on the demonstration of a virtual mentor. Independent learning style is an important element of life in modern society (McLoughlin & Lee, 2008). An individual is always looking for information to deal with problems at work, school, or to satisfy curiosity or inquiry. Therefore, they need to take advantage of technology and network not only to get information, but also to share information. Thus, an individual cannot be considered as passive consumers of information, instead, they active co-mentor. In addition, learning in social media contexts such as learning virtual provide motivation, autonomy, and informal, and it also a part from self experience (McGloughlin & Lee, 2010; Smith, Salaway, & Caruso, 2009; Solomon & Schrum, 2007).

Level 3 is called as the fossilization. Teachers can relate the skills that learned in coaching and mentoring skills obtained independently. Self guidance plays an important role to improve the productivity of the system education by conducting teaching and learning based on individual needs and make individuals more active in effective learning. Individual learning is also will produce a new generation of self-confident and more independent in their learning challenges (Miliband, 2003).

Level 4 is the application level. It is the level which teachers can apply what they have learned in a self-mentorship and guidance in the future. They can solve problems and design learning in this stage. Self-regulated learning by ongoing mentoring in the face task difficult in the daily routine of teachers (Kitsantas & Dabbagh, 2010).

LEARNING DESIGN OF e-CPD

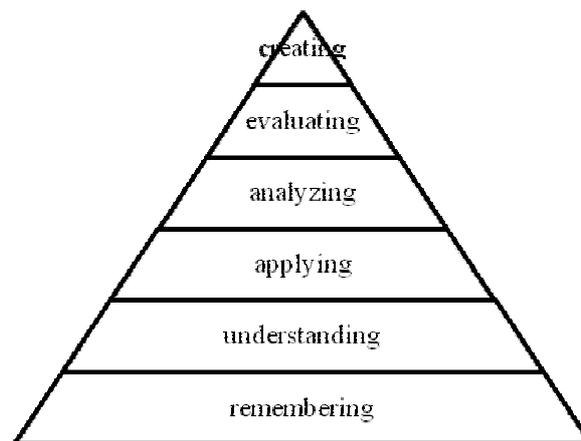


Figure 2 : Revised Taxonomy Bloom

(Source: http://ww2.odu.edu/educ/roverbau/Bloom/blooms_taxonomy.htm)

The shift from one dimension to two dimensions in the RT has led to the formation of a two-dimensional Taxonomy Table (TT). This table functions as an analytical tool of the RT (Bumen, 2007). Amer (2006) in his study mentioned that the TT can be used for several reasons such as (i) to analyze and reflect the objectives of a curriculum or a syllabus, (ii) help teachers not to confuse their activities or tasks with the objectives, (iii) to help teacher be aware of the relationship between assessments and their teaching-learning activities, and (iv) to examine the curriculum alignment. Anderson (2002) revealed that TT can be advantageous in estimating the curriculum alignment regardless of the subject matter or the school level. He further added that a strong link between the objectives, instruction, and assessments ensures that the curriculum is aligned. Gorin and Blanchard (2004) concurred that the alignment of the abovementioned elements will result in successful student learning; research shows that alignment of the curriculum brings a positive influence on achievement (English & Steffy, 2001).

Bumen (2007) stated the pluses of using the RT and his research, and added that studies conducted based on RT and planning skills are very minimal. The results of his study confirmed other studies which have indicated a number of benefits of RT in the planning of lessons (Anderson, 2002; Andrich, 2012; Ferguson, 2012; Krathwohl, 2002; Mayer, 2002; Pintrich, 2002; Su et al, 2004; 2005; Amer, 2006). Owing to the results of these

studies, it is fair to come to a consensus that RT has made several improvements in curricular development in the field of education (Bumen, 2007). Nasstrom (2009) conducted a study in Sweden using RT to evaluate functions of mathematics and considered it valuable in his research. Furthermore, Nobel (2004) incorporated RT with Multiple Intelligences and found it to be effective. Ayvaci and Turkdogan (2010) also reported RT to be successful in evaluating Science and Technology questions. Ari (2011) mentioned that RT has gained its popularity on the international stage. More studies should be done to develop pre-service or in-service teacher education by using the RT (Bumen, 2007); also, to see if the RT is across other subject fields (Bumen, 2007; Nasstrom, 2009). Bumen (2007) in his study also recommended the taxonomy table to be used by teachers to model the way they teach and later, to analyze they teaching.

Borko (2004) argued that professional development should be underpinned by both the cognitive and social aspects of learning; nevertheless, Watson (2013) pointed out that theory has tended to place emphasis on either cognitive or social perspectives. Cognitive perspectives focus on the concepts of changes in teachers' beliefs and knowledge (Watson, 2013) whereas the social perspectives are centered on professional development through participation (Lave & Wenger, 1991). Lave and Wenger (1991) advocated that professional development must be revolved around the communities of practices. According to Bradley (2011), constructivism is the cutting-edge learning theory among all the three major schools of learning theory – behaviorism, cognitivist, and constructivism. Since most of the professionals in this day and age adopt a constructivist pedagogical framework, the behaviourist and competence-based process model is found to be inconsistent in the professional development programs (McMillan, Walsh, Gray, Hanna, Carville, & McCracken, 2012). Hence, Sullivan Palinesar (2005) has proposed that the design professional development programs for teachers should be based on the principles of social constructivism.

Knabe (2004) pointed out that among all the theoretical frameworks that underpin online course development and teaching, survey of the literature shows that the most commonly cited is the constructivism theory. Researchers have come to a consensus that online course designs that are based on the constructivist theory have borne success of the particular online course (Gold, 2001; Ausburn, 2004, Salter, Richards & Carey, 2004; Wiesenbergl & Stacey, 2005; Chitanana, 2012). The constructivist epistemology is supportive to teachers in terms of setting an environment which emphasizes on learner collaboration, reflections and designing authentic tasks, which enhances learner participation and encourages active learning (Merrill, 1992; Gold, 2001; Savery & Duffy, 2001, Ausburn, 2004). Thus, in this respect, the constructivist theory is in line with the successful online teaching strategies which involve community learning, collaborations and interactions, as well as deep and meaningful learning experiences (Chitanana, 2012). Gulati (2008) has mentioned that a “social constructivist experience” occurs when constructivism is applied in the design of online courses (p.184).

Most online learning is related to social constructivism with an emphasis on collaboration in solving tasks (Bonk & Cunningham, 1998; Jonassen, Peck & Wilson, 1999) as well as individual development through sharing of text and other cultural tools (Gergen, 1995; Postholm, 2012). Chitanana (2012) stressed on the significance of the social aspect in designing an online learning content and that participants ought to be provided with chances to engage in dialogues with other learners as well as experts of the respective fields. Previous literature confirms that the discussion platform enhances learning and promotes engagement in learning, application of critical thinking besides the building of knowledge (Laurillard, 1994; McLoughlin & Luca, 2000). Pitsoe and Maila (2012) reported that despite the availability of rich literature on constructivist learning theories and their usability in South Africa, there is, however, a very minimal attention on the implications of constructivist insights and practices for teacher professional development and teacher education; hence, they argued that principles that are attuned with the contemporary paradigm should underpin and guide the teacher professional development programs.

RESEARCH METHODOLOGY

Content analysis technique is used in analyzing the data which is based on ICT Competency Matrix for primary school teachers. Suggested activities are analyzed in this section.

Analysis of the data is applying Bloom's Taxonomy. The data is further looked into three domains such as cognitive, affective and psycho-motor. Cognitive domain is used to measure intellectual skills. The affective domain is used to measure generic skills, which have been applied to participation in associations and also in a variety of group discussion as in the course of system design and so on. Psycho-motor domain seeks to measure the practical and technical skills. These skills are applied through industrial training, laboratory testing and technical visits. Thus Bloom taxonomy can be used to measure the effectiveness of training. (Kim Chee Mang, 2002). Each of these categories will be analyzed in each level of e-CPD mentoring based on activities at all levels.

Domain taxonomy of cognitive skills is used to measure intellectual skills based on a cognitive hierarchy are sorted from low level to high level of level of remembering, understanding, application, analysis, evaluation and creating (Russell Baker, Gina M.Almerico, Barry Thorton, 2008).

RESEARCH FINDINGS

Domain taxonomy in cognitive skills is used to measure intellectual skills based on a cognitive hierarchy. They are sorted from low level to high level of remembering, understanding, application, analysis, evaluation and creating.



Figure 3 : Forum

Remembering

Remembering involves activities such as recall, recognize the idea, the basic fact, the definition of the theory, law, dates, events and other learning from the past. An individual can state, describe, name and label of acquired knowledge. Forum Questions About Creative Multimedia helps the teachers to recall what they have learned via e-mentoring. Figure 3.1 shows that teachers are able to describe about the font that they have learned to mentor via forum. It suggests that teachers be able to recall what they have learned in the forum like a new font that helps a teacher in his or her job well. Teachers are using some fonts that they learned in their work. Teachers are able to identify what they have learned through the downloaded videos from a web application for their assignments. They get to know about the instructions and all steps or activities from the video as shown in Figure 3.2. This indicates that teachers are able to follow the instructions shown in making good power point presentation without any problem and they can recognize new ideas in their product.



Figure 4 :Video on 'How to make powerpoint animation'

Understanding

Understanding involves comprehension activities which involve changes from one form to another form, stating the main ideas in our own words, translate, give examples of the concept and translate the draft. Teachers can choose, explain and rewrite what they have learned in the mentoring system for e-CPD. Tasks performed by the teacher are able to prove that they can change what is understood in mentoring from one form to the another form. For example, a teacher has to understand how to download fonts creatively through e-CPD mentoring. He can use it in Year 1 for decorative purposes. The activities conducted in e-CPD mentoring is showing that teachers are also able to express or translate what is known for them during the application of learning. A teacher has to get guidance from mentors on how to create a montage for e-CPD tasks, which is given by e-mentor. The teacher has produced montage and have uploaded in Youtube with the guidance of e-mentor. This suggests that teachers can choose appropriate methods of instruction and utilise it in more detail to achieve creative result.



Figure 5: Forum JomShare Font

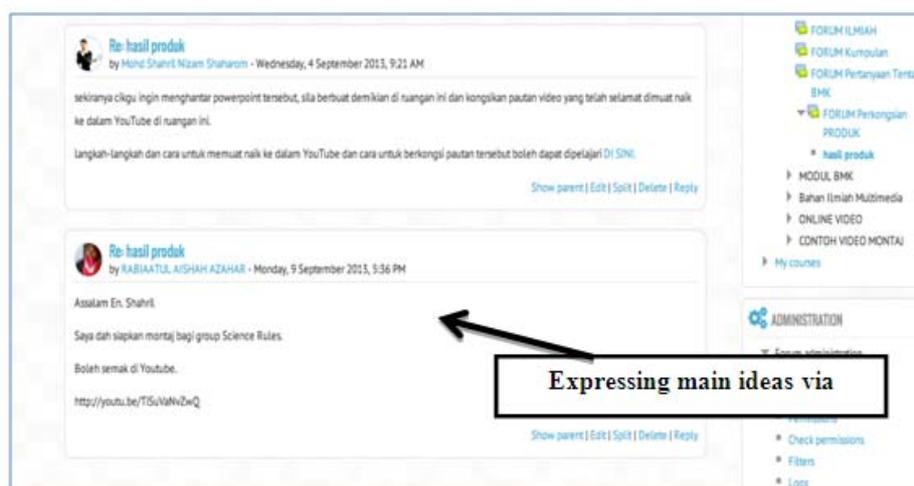
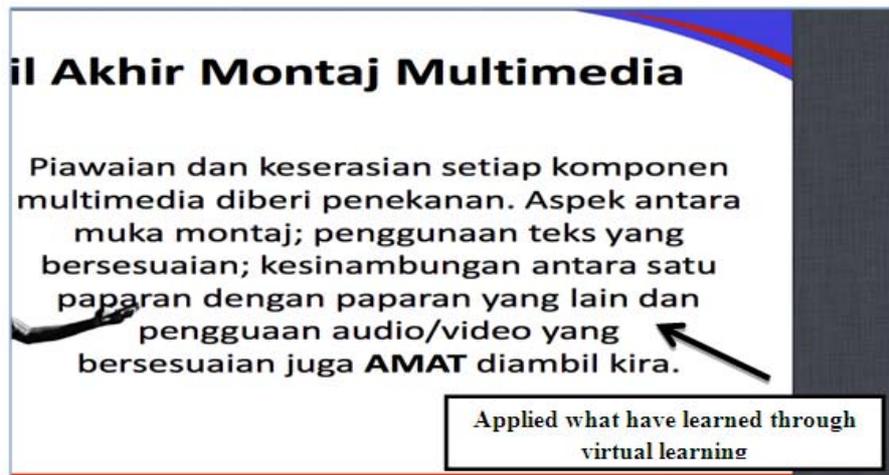


Figure 6: Portal to upload products

Application

The application involves activities such as using information in new situations, including solving problems, using the principles, rules, laws, theories and formulas, creating graphs from data, and others. Teachers can use the information obtained from a mentor to new situations. For example, teachers can find on how to complete their tasks through a mentoring system for e-CPD and utilize what they have learned in the training to do further studies. Teachers are also able to solve the problems being faced through a video uploaded in the web application by e-mentor. Teachers can correct their mistakes during the task by viewing the steps or stages shown in the video to solve their problem.



Forum 7 :Module – Guide to design develop educational montage

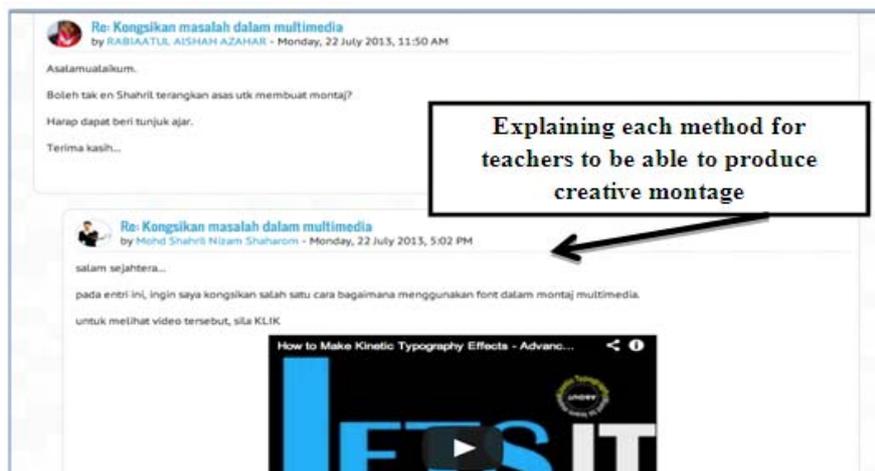


Figure 8 : Forum how to produce creative montage

Analysis

Analysis includes activities such as break something complex to a small, distinguish fact from opinion, association between the familiar and the known structure of the organization. Teachers can differentiate, and choose a method to solve the assignments given by e-CPD mentor. Teachers can distribute or break what they have learned to other ideas. For example, they can analyze the guidance provided by mentors and utilise it in other situations that are appropriate to them in their fieldwork. Teachers are able to distinguish fact from opinion given by the mentor. They can also relate to their daily work. For example, teacher is able to ensure key facts of the ideas given by the e-mentor.



Figure 9 : Montage – Youtube video

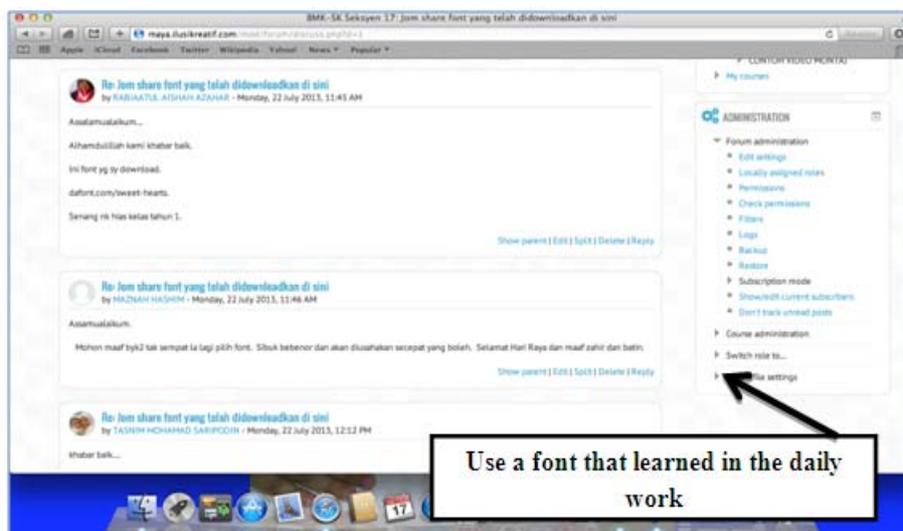


Figure 10 : Forum about the introduction of new fonts

Evaluating

Evaluating includes activities such as integrating, assembling ideas into a single, independent efforts, solve problems, make predictions and make the classification. Teachers can build, create, organize and develop what they have learned through mentoring system of e-CPD. Teachers can integrate, assembling ideas into one and work independently to fulfill their duties. For example, teachers can create a powerpoint presentation and change it's format in slideshare. Teachers are also able to solve the problem of e-CPD mentoring through the downloaded video from e-CPD. Teachers can classify what they have learned through the video.

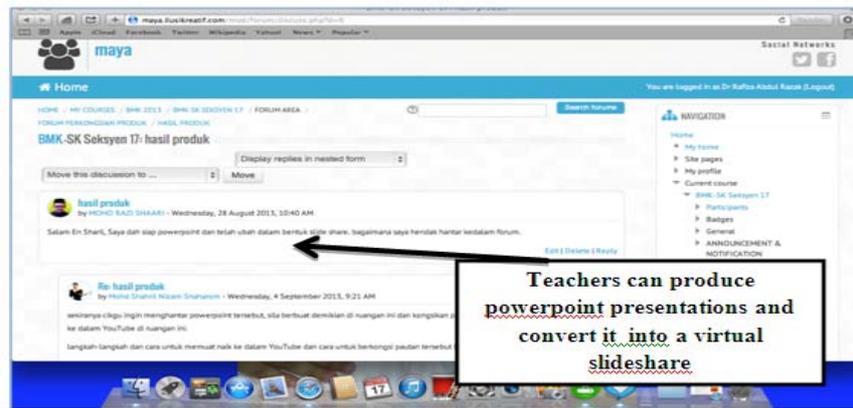


Figure 11 : Forum to create products



Figure 12 : Virtual video

Creating

Creating involves activities such as making a rational judgment, including internal or external, and to read and criticize. Teachers can choose, justify, critique and prove through a mentoring system of e-CPD. Teachers may consider the reasons given by the mentor via e-CPD. Teachers think rationally before using them in their work. Teachers can read and criticize each result in the forum. They can improve the quality of work through criticism and positive comments.

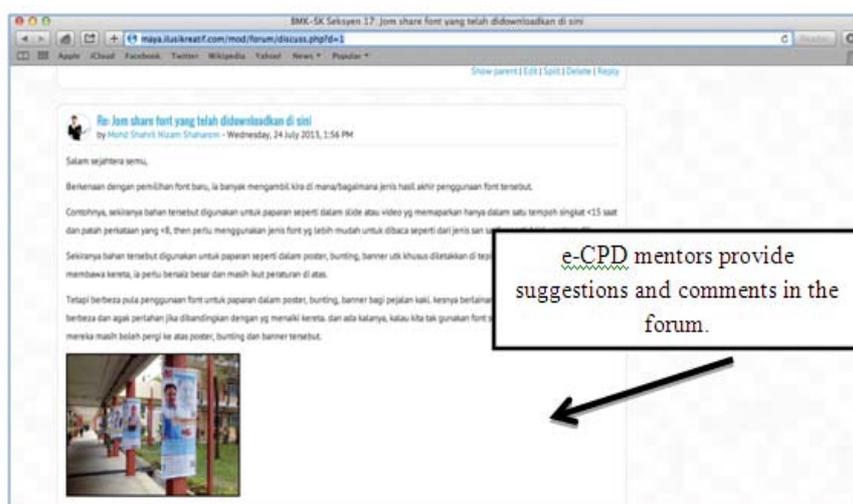


Figure 13: Answers from mentor for teachers' questions through forum



Figure 14 : Video uploaded at sites

RESEARCH IMPLICATION

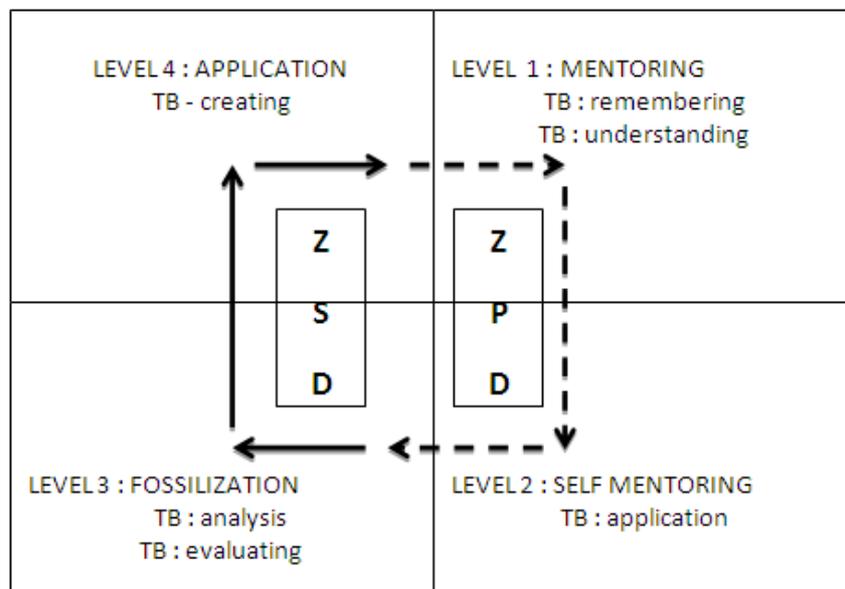


Figure 15 : Transformation of knowledge to application via e-CPD

e-CPD was implemented applying Taxonomy Bloom (TB) that covers all phases and activities of the professional training of teachers in e-CPD. Bloom's taxonomy includes remembering, understanding, application, analysis, evaluating and creating. These activities can be distributed into four levels, such as, coaching, self-coaching, fossilization and applications.

Level 1 and Level 2 involves "Zone of Proximal Development" in this conceptual framework. Level 3 and Level 4 involves " Zone of Self Development ". It is a form of a cycle where every time the teachers will be guided when a new skill is taught or introduced to them. e-CPD mentors play an important role in every cycle of this level. Therefore, on the whole the mentor plays an important role in every level of activity to run it properly.

Level 1 is the level of coaching in which mentors will guide and assist teachers in primary schools to perform certain tasks in the e-CPD. e-Mentor will play an important role in helping to solve the problems faced by teachers in the design. Continuous communication and proper guidance are essential components of a successful mentoring relationship. It will improve mentoring relationships, setting and monitoring of professional goals in helping the participants of ICT skills training (Portner, 2002).

Level 2 is the level of self-guidance. Primary school teachers are required to solve the problem independently based on the demonstration given the e-CPD mentor. Self or personal learning style is an important element of life in modern society (McLoughlin & Lee, 2008). An individual is always looking for information to deal with problems at work, school, or to satisfy curiosity or inquiry. Therefore, they need to take advantage of the technology and the network is not only to get information, but also to share information. Thus, an individual cannot be considered as passive consumers of information, instead, they are active with their e-mentor. In addition, learning in the context of social media such as e-CPD provide motivation, autonomy, and informal experience (McGloughlin & Lee, 2010; Smith, Salaway, & Caruso, 2009; Solomon & Schrum, 2007).

Level 3 is called as the fossilization. Teachers can relate the skills learned in coaching and mentoring skills which is obtained independently. Self guidance plays an important role to improve the productivity of the education system. Other than that, self guidance also helps to carry out the teaching and learning process based on individual needs to make the individuals play more active role in effective learning. Individual learning will also produce a new generation with self-confident and more independent in learning (Miliband, 2003).

Level 4 is the application level. It is the level where teachers can apply in the future what they have learned in personal learning and e-CPD mentoring. They can solve problems and design learning process in this level. Personal learning via mentoring helps t to overcome difficult task in the daily routine of teachers (Kitsantas&Dabbagh, 2010). In addition, teachers can learn ICT skills, such as creative multimedia elements such as text, audio, video, graphics and animation via e-CPD.

According to Vygotsky (1987), an individual's benefit from using tools or instruments in two ways. First, the tools that are used to mediate activity and changing all psychological operations fundamentally. Therefore, there are high opportunities for learning through the use of tools. Second, the use of tools with the help of social interaction through field experts or an adult. It plays a role as a mediator of higher mental processes and cognitive engagement triggers greater than themselves (Vianna, E. &Stetsenko, A., 2006). So, learning occurs when individuals are less skilled are scaffolded (guided) by individuals who are experts in social interaction by working in groups (Verenikina, I., 2003). Therefore, students or course participants have the opportunity to work and learn together.

Based on the results, the bloom taxonomy of cognitive processes qualitatively constructed based on the integration of multiple ICT skills in the learning process. Bloom's Taxonomy are sorted from from the lower to higher level. ICT skills are used to create an environment where personal learning can help participants learned skills independently. However, an increasing number of websites provide a way of cooperation or collaborative skills in improving aspects of understanding. Guidance (scaffolding) is a term often used to describe any help, involves the design of supervised learning (scaffolded), which is a demonstration of teaching skills and assessments. By Jill N.Samuel Hamzah and Joy (2010), this concept refers to the guidance given by an adult in the process of teaching and learning through the questions and interactions. Taxonomy Bloom focuses on the cognitive processes involved in ICT skills. It is a process that helps learning mechanisms. The incorporation of Blooms Taxonomy bridges the gap between the teachers' knowledge and its application. Hence teachers are able to apply their learning to authentic workplace situations to improve on-the-job performance.

CONCLUSIONS

Overall, e-CPD based on mentoring system plays an important role in training teachers in cyberspace. The role of education is important in this challenging era where education has a great responsibility to implement educational policies where able to increase the use of ICT in teaching and learning. The use of ICT is increasingly important in generating and developing ideas and creativity of educators in the teaching and learning process. In this context, globalization has brought with the concept of a world without borders. These changes affect either positively and negatively to the community in developing countries.

Implementation of ICT is a paradigm shift in education which will help our country to compete with other countries. The information revolution that occurred due to advances in ICT provide new challenges to the teaching profession. As well as, it is a drastic progress where should be used to enhance the prestige of the teaching profession which is facing changes in the 21st century. In this case, developing countries need more teachers who have specialized knowledge of the field of information of communication and technology (ICT). Teacher education training also requires a paradigm shift in order to produce teachers who are qualified and capable of educating and developing a nation.

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