Acceptance of Technology and its Impact on Teacher's Activities in Virtual Classroom: Integrating UTAUT and CoI into a Combined Model

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ABSTRACT
This study examines the acceptance and use of learning management systems (LMS) among higher-education teachers and the relation between their use of such systems and their teaching approaches in the context of online learning, following the community of inquiry (CoI) framework. A total of 326 teachers at University of Ljubljana completed a questionnaire. Our main research goal was to examine the impact of a basic Theory of Acceptance and Use of Technology (UTAUT) structural model, with the CoI framework as a complement. The latter adds three new aspects to the use of LMS for educational purposes, representing complex cognitive and social dimensions of teaching in the virtual space. We found that the crucial factor for LMS acceptance by university teachers is the immediate social influence at work, but the formation of the learning process largely depends on the characteristics of the LMS tools and the perceived usefulness of the application.

Keywords: Community of Inquiry; Technology acceptance; Blended Learning; Technology in education; Teachers; Higher Education; UTAUT

INTRODUCTION
The development and widespread availability of technology in the last decades has had an important impact on society. One of the fields that has seen significant changes at the institutional level due to rapid technological advance is education (Halverson et al., 2014; Lei & Zhao, 2007; Mažgon et al., 2015; Radovan & Dinevski, 2012; Yang, 2012). As a result of technological advancement, many higher education institutions are incorporating ICT into their teaching process as a way to transform traditional pedagogy and improve existing teaching strategies (Halverson et al., 2014; Mažgon et al., 2015). The uniqueness of new technologies can be found in their multidimensional ways of facilitating communication and interaction between students and teachers in virtual environments. Students are at the same time alone and detached from their groups and from the teacher, although they are communicating among themselves in more than one way. The teacher, in this context, plays a crucial role throughout the learning process in managing and monitoring students' activities. To understand the processes and efficacy of learning in online learning environments, Garrison, Anderson, & Archer (2000) developed a theoretical framework called community of inquiry (CoI) as a conceptual tool for supporting an educational experience in virtual learning environments. The success of introducing these new models and teaching concepts that are based on new technologies is inextricably related to teachers' acceptance and willingness to use those technologies. Davis (1989), who proposed the Technology Acceptance Model (TAM), believed that the key factors in adopting new technology (e.g., a new method of delivering online educational content) are its perceived usefulness and ease of use.

In our study, we examine if the determinants of UTAUT model (Venkatesh et al., 2003) can offer some insights on the CoI model (Garrison, Anderson, & Archer, 2000), more specifically: i) what are the main determinants of the e-learning environment among teachers at the university, and ii) how is teaching presence influenced by the frequent use of online learning environments?

COMMUNITY OF INQUIRY FRAMEWORK IN ONLINE LEARNING
The community of inquiry (CoI) is a theoretical framework designed more than 20 years ago by Garrison et al. (2000) with the intention of providing a conceptual tool for using computer-mediated communication in supporting educational experiences. The results of meta-analysis carried out by Zhen et al. (2014) indicated that technology support of collaborative learning is one of the major research topics in the field of computed-

supported collaborative learning (Zheng, Huang, & Yu, 2014). The CoI concept was not new; it was first introduced by philosophers C.S. Peirce and John Dewey, concerning the nature of knowledge formation and the process of scientific inquiry (Pardales & Girod, 2006). The concept of "community of inquiry" was later extensively developed by Lipman (2003). Peirce used the terms "community" and "inquiry" to refer to a group of individuals employing an interpersonal method for achieving results (Pardales & Girod, 2006). Amore recent definition of community of inquiry is a group of individuals that participate in critical discussions and reflection in order to create their own meanings and confirm shared understandings of the topic under discussion (Garrison et al., 2000). The main assumption of CoI is that effective online learning is not simply a consequence of cognitive factors and the teacher; rather, the social aspect is equally important, which means that effective online learning requires the existence of a community. Starting from Dewey's work and the constructivist paradigm, the authors place educational experience in the centre of the learning process, with the latter being the result of the interaction of three independent presences of learning: cognitive, social, and teaching presence (Garrison et al., 2010).

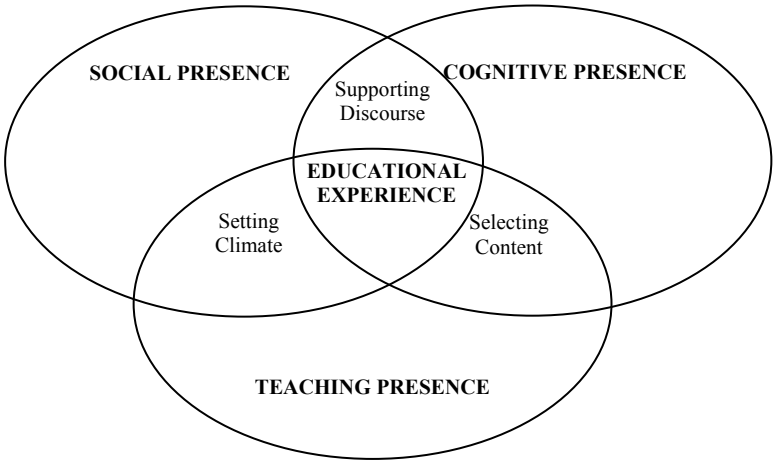

Figure 1. Community of inquiry framework (Garrison et al., 2000)

Cognitive presence is defined as the extent to which learners are able to construct and confirm their notions through reflection and discourse (Garrison et al., 2001), and it partially depends on encouraging or limiting communication by medium. The cognitive presence of the CoI model is defined by the psychological or sociological dimension of the educational process on the vertical axis, presenting the individual's constant opposition of the private world to the community, and divergent or convergent processes of the construction of meaning and perception on the horizontal axis.

Social presence is described as the degree to which online learning participants feel effectively connected to one another, or "as the ability to project one's self and establish personal and purposeful relationships" (Garrison & Arbaugh, 2007) with other participants. The key concepts of social presence in education, generally, are emotions, interaction, and cohesion. Social presence in online learning has received the most research attention from the authors as well as other researchers, especially because of the limits imposed by online learning environments on communicating, developing a sense of belonging to a group, and expressing emotions.

Teaching presence is defined as "the design, facilitation, and direction of cognitive and social processes for the purpose of realizing personally meaningful and educationally worthwhile learning outcomes" (Anderson et al., 2001). The dimensions of teaching presence represent teachers' responsibility in online learning and are divided into three categories:

1. design and organization referring to the activities that a tutor does before the learning activities begin, that is, the preparation of the learning environment, such as learning materials, activities, instructions, etc.;
2. facilitating student-to-student discourse with the purpose of maintaining the interest, motivation, and engagement of students;
3. direct instruction to provide "intellectual and scholarly leadership and share their [the teachers'] subject matter knowledge with students" (Anderson et al., 2001).

Authors of the CoI model (Garrison et al., 2000) base the development of a critical community of inquiry on teaching presence as much as on cognitive and social presence. They ground their theses on the significance of the teacher's presence in online learning on previous research, which confirms the positive influence of the teacher on students' learning activities. At the same time, the teacher has proven to be the key factor in establishing and facilitating discussion, which the authors (Anderson et al., 2001) believe to be a particularly important goal of higher education.

FACTORS AFFECTING TEACHERS' USE OF TECHNOLOGY

There have been several studies that have examined the factors influencing teachers' use of ICT (Baz, 2016; Buchanan, Sainter, & Saunders, 2013; Marcinkiewicz, 1993; Mumtaz, 2000; Pynoo et al., 2011; Wichadee, 2015; Wong et al., 2016). Pynoo et al. (2011) identified two main directions of research on the acceptance of technology in education: on the one hand are acceptance studies that measured teachers' acceptance of technology operationalized as the intention to use (e.g. Teo, 2011), and on the other is research that examined teachers' attitudes toward computers, beliefs, and the integration of computers in the classroom (Hermans et al., 2008).

Theories of technology acceptance are typically multidisciplinary (Dillon & Morris, 1996), as researchers have strived to understand how and why users either accept or reject new technologies (Stefl-Mabry, 1999). In addition to the technological aspect (characteristics of technology, ease or complexity of use, etc.), their multidisciplinary approach also focuses on the sociological (the impact of closer and wider environments on acceptance, voluntariness of use, etc.) and psychological (perceived usefulness, perceived ease of use, etc.) aspects. Technology acceptance theories have been bases for the models, which start by quantifying technology acceptance so that it becomes a measurable and comparable phenomenon. Consequently, researchers look for cause-and-effect relationships to predict the level of acceptance for a specific technology, which is useful for both identifying the causes of rejecting technology and predicting its use (Venkatesh et al., 2003).

Venkatesh et al. (2003) developed the Unified Theory of Acceptance and Use of Technology (UTAUT), which combines the findings of all the theories and models. They employed a comprehensive meta-analysis of existing empirical studies to define a precise framework of independent constructs originating from the theories. The framework aims to explain and predict use behaviour or monitor changes in the factors that affect technology use behaviour through time.

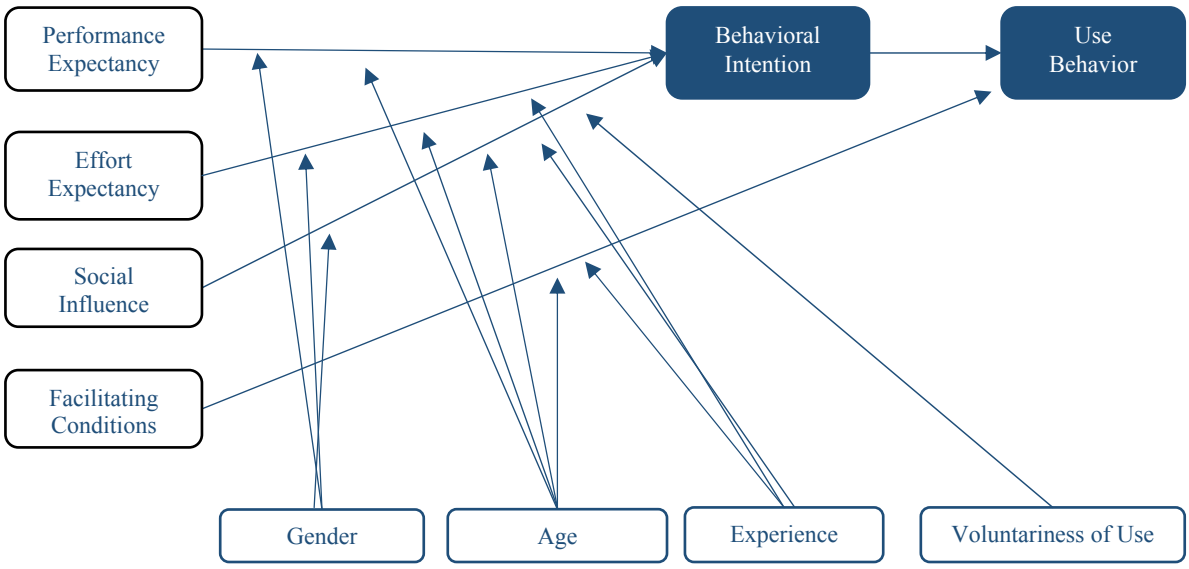

Figure 2. The basic UTAUT model (Venkatesh et al., 2003)

They identified four core constructs and four key moderators that have a significant influence on technology acceptance and use. According to the model, performance expectancy, effort expectancy, social influence, and facilitating conditions are the core determinants of behavioural intention or use behaviour on the acceptance of the technology. Gender, age, experience, and voluntariness of use are the moderators, which have no direct influence on the intention or the use of technology, but have indirect effects on cognitive behavioural factors (see Fig. 2). Performance expectancy shows the degree to which teachers believes that using e-learning environment

will help them to perform better professionally. This construct is the most significant indicator of intention, regardless of whether or not technology use is voluntary. The effort expectancy is teachers' belief level about how easy it is to use technology in an e-learning environment, or whether this technology is user-friendly. Social influence is defined as the degree to which an individual teacher perceives that his or her colleagues and others see that the use of e-learning as significant. Facilitating conditions include the teacher's beliefs that an organizational and technical infrastructure exists to support the use e-learning environment. In other words, this is an individual's view of whether he or she has the available resources (tools, equipment, expertise, etc.) he or she needs to use the system. Dependent variables in this model include behavioural intention, which represents teachers' intention of using the e-learning environment in the future, and use behaviour, which represents how much teachers use the e-learning environment.

PURPOSE OF THE STUDY

The purpose of this study is to develop a conceptual model that will describe the determinants or the dimensions of CoI by predicting of readiness to use (i.e., behavioural intention) and the actual use (i.e., use behaviour) of learning management systems (LMS) among teachers at the University of Ljubljana (UL). The majority of the UL faculty uses Moodle LMS, a tool for blended learning, but there are also cases where other LMS systems or tools are used. In the introduction of this article, we suggested that CoI is a model that enables us to describe and understand teaching in virtual learning environments that enable students to be engaged in creative and collaborative learning activities. Among the three elements of CoI, teaching presence is believed to be the key element that promotes the development of social and cognitive presences (Anderson et al., 2001). Our main hypothesis is that the formation of the teaching presence is directly influenced by the acceptance of new approaches of blended teaching in higher education and the acceptance and usability of the university's LMS. To test this assumption, we used the UTAUT model with the CoI model. Combining both models, we developed a model (see Fig. 3) in which we assume that perceived usefulness, effort expectancy, and social influence will have an important influence on the readiness to use, and that the readiness will impact use frequency, on which teaching presence in an online learning environment depends.

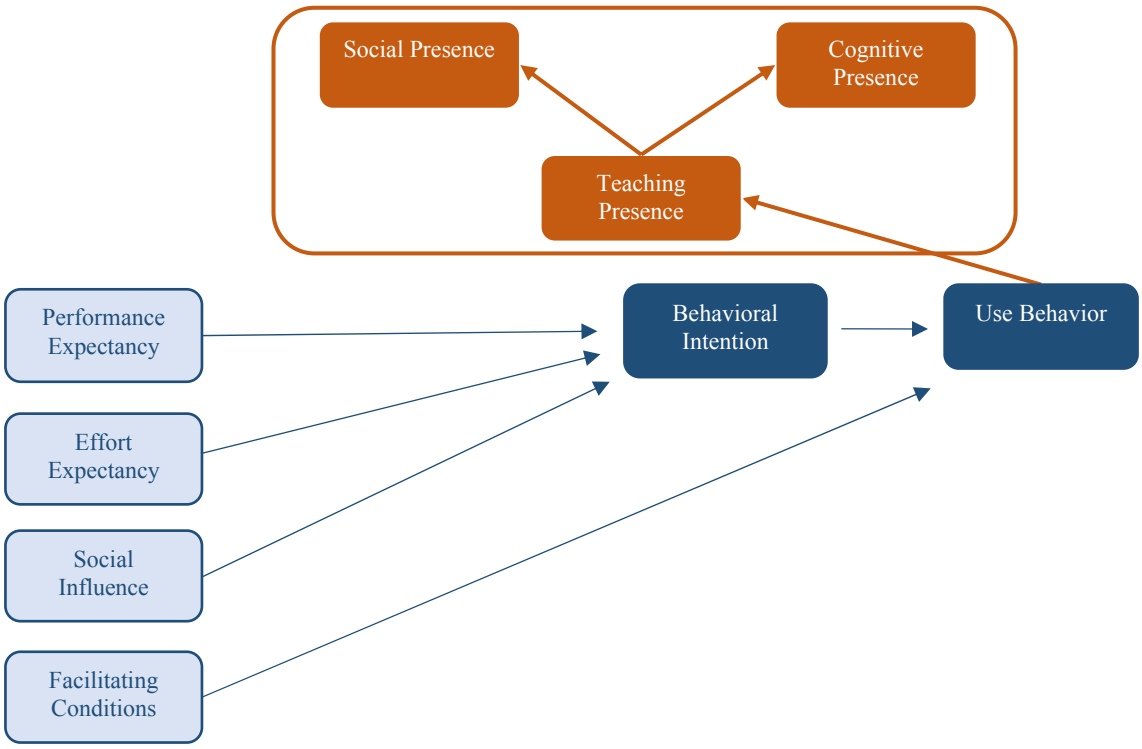

Figure 3: The proposed theoretical model

METHODOLOGY

Participants

The sample in our study included teaching staff (N = 326) employed at the University of Ljubljana. The sample included 51% male and 49% female respondents. The majority of respondents were between 31 and 50 years old (59%), and 30% were between 41 and 50 years. Respondents over 60 years old and younger than 30 years shared

the same percentage at 9% and 10%, respectively. The sample included all 26 higher education institutions within the University of Ljubljana. The majority of respondents came from the arts faculty (18%), followed by respondents in the biotechnical faculty (9%), the mathematics and physics faculty (7%), the medicine and education faculties (both 6%), and the social science faculty (5%). Other higher education institutions represent less than 5% of the sample.

Measures and procedure

Instruments and procedures

The data was collected via web survey and analyzed using quantitative empirical research methods, which included univariate and multivariate research methods in order to describe, explain, and predict the studied phenomena. Structural equation modeling was the main technique used for data analysis. It was performed with SPSS and AMOS statistical packages.

The web survey was divided into three sections:

1. The first part contains items from the standardized UTAUT questionnaire; this section includes 5 constructs made up of 20 items and 5 additional questions, presenting 4 additional moderators in the model, which are also the socio-demographic indicators. This section also includes the question about the frequency of e-learning environment use (Venkatesh et al., 2003).
2. The second part comprises items following the CoI theoretical framework; the section includes 3 constructs made up of 34 items (Arbaugh et al., 2008).
3. The third part consists of 3 additional socio-demographic questions (not used in this article).

The respondents expressed their (dis)agreement with the statements on a 5-point Likert scale (1= I strongly disagree; 5= I strongly agree).

Data analysis and validation

The exploratory factor analysis (EFA) was performed in order to (1) identify dimensionality of constructs and (2) to test whether there are any factor cross-loadings. Due to the complexity of the model, the determination of the possibility of existence of a multicollinearity among exogenous latent variables was a high priority. The EFA included 54 observed variables and was performed separately on UTAUT and CoI framework's variables. The variables, which were low-loading (factor loadings less than 0.4) or were cross-loading multiple factors were excluded from further analysis due to their potential harm to the validity of the measurement model. The retained observed variables had high loadings on factors, which they theoretically represent. It turns out that teaching presence is a multidimensional construct and not unidimensional, as theoretically assumed (Garrison et al., 2000), but consisting of two dimensions – (1) planning and organization of learning (TPa) and (2) guidance and facilitating discussions (TPb). All other constructs were identified as unidimensional. Based on the EFA results, twelve variables were excluded from further analysis, and nine constructs were extracted.

The Cronbach's alpha indicates good internal consistency of constructs:

Table 1: Construct's structure and their reliability

Construct name	**Cronbach's Alpha**
Performance Expectancy (PE)	0,821
Effort Expectancy (EE)	0,874
Social Influence (SI)	0,815
Facilitating Condition (FC)	0,779
Behavioral intention (BI)	0,970
Planning and Organization of Learning (TPa)	0,904
Guidance and Facilitating Discussions (TPb)	0,890
Social Presence (SP)	0,944
Cognitive Presence (CP)	0,965

The KMO coefficient (0.90) of sampling adequacy is satisfactorily high, and the χ^2 of Bartlett's test of sphericity (9595.97; df = 1431; $p<0.001$) is statistically significant as well. In addition to the constructs already mentioned, the model also has one measured variable, which represents the use (frequency of use) of the LMS.

Once the dimensionality of construct was identified, the measurement model was built in AMOS. A confirmatory factor analysis (CFA) was used to test the convergent and discriminant validity of constructs in the model and the model fit, where the average variance extracted (AVE) measure and the squared interconstruct correlation (SIC) was used in order to conclude the convergent and discriminant validity. Convergent validity occurs when AVE values for each individual construct reach or exceed 0.5, while SIC values among the constructs must be lower than the AVE – only then can we infer discriminant validity (Hair, Black, Babin, & Anderson, 2009). AVE values are the arithmetic mean of the squared standardized factor loadings of observed variables on each factor (Fornell & Larcker, 1981), and SIC values are squared interconstruct correlation coefficients. AVE and SIC values were calculated for each construct separately and are shown in Table 2.

Table 2: Convergent and discriminant validity

		PE	**EE**	**SI**	**FC**	**BI**	**TPa**	**TPb**	**SP**	**CP**
	AVE	0,61	0,71	0,63	0,55	0,92	0,84	0,52	0,75	0,72
PE	0,61									
EE	0,71	0,24								
SI	0,63	0,23	0,05							
FC	0,55	0,24	0,24	0,26						
BI	0,92	0,48	0,14	0,37	0,44					
TPa	0,84	0,20	0,06	0,09	0,14	0,23				
TPb	0,52	0,14	0,03	0,03	0,02	0,07	0,37			
SP	0,75	0,07	0,02	0,00	0,00	0,02	0,12	0,45		
CP	0,72	0,20	0,03	0,03	0,09	0,12	0,29	0,37	0,22	

Both convergent and discriminant validity of construct were reached, as values of AVE exceeded 0.5 and no SIC values exceeded the AVE of each construct. The CFA results were used to develop a structural model that met the criteria of model fit indicators, and was theoretically adequate. The maximum likelihood method was used for SEM, which reduces the differences between observed and expected covariance among variables to the lowest possible value.

RESULTS

Based on CFA results, the suitability of the proposed theoretical model was tested, but as internal correlations between latent variables were also the matter of interest, modification indices were considered in order to build the optimal model. Based on the modification indices, modified structural model was built, where content suitability was also considered. It was built to better explain e-learning environment use and teaching in an online learning environment.

Figure 3 shows the number of observed variables models the latent constructs. What has changed from the test model is the number of exogenous latent constructs (SI), and the other originally anticipated exogenous constructs (PE, EE, FC) have become endogenous. Some other relations among constructs have also been changed, and no statistically non-significant relations are contained in the model. The model fit indices remain within valid values, although the measures $\chi 2/df$ and NFI have worsened slightly. Nevertheless, the modified model explains the greater shares of construct variability. Additionally, the increase of the strength of interconstruct relations was succeeded. The modified model is, however, slightly more parsimonious than the theoretical model.

Table 3: The modified structural model fit indices

	χ^2	**df**	***p***	χ^2/**df**	**RMSEA**	**NFI**	**CFI**	**PNFI**
valid values				≤ 3.0	≤ 0.05	≥ 0.8	≥ 0.9	≥ 0.6
structural model	2091.55	849	0.00	2.46	0.05	0.84	0.90	0.76

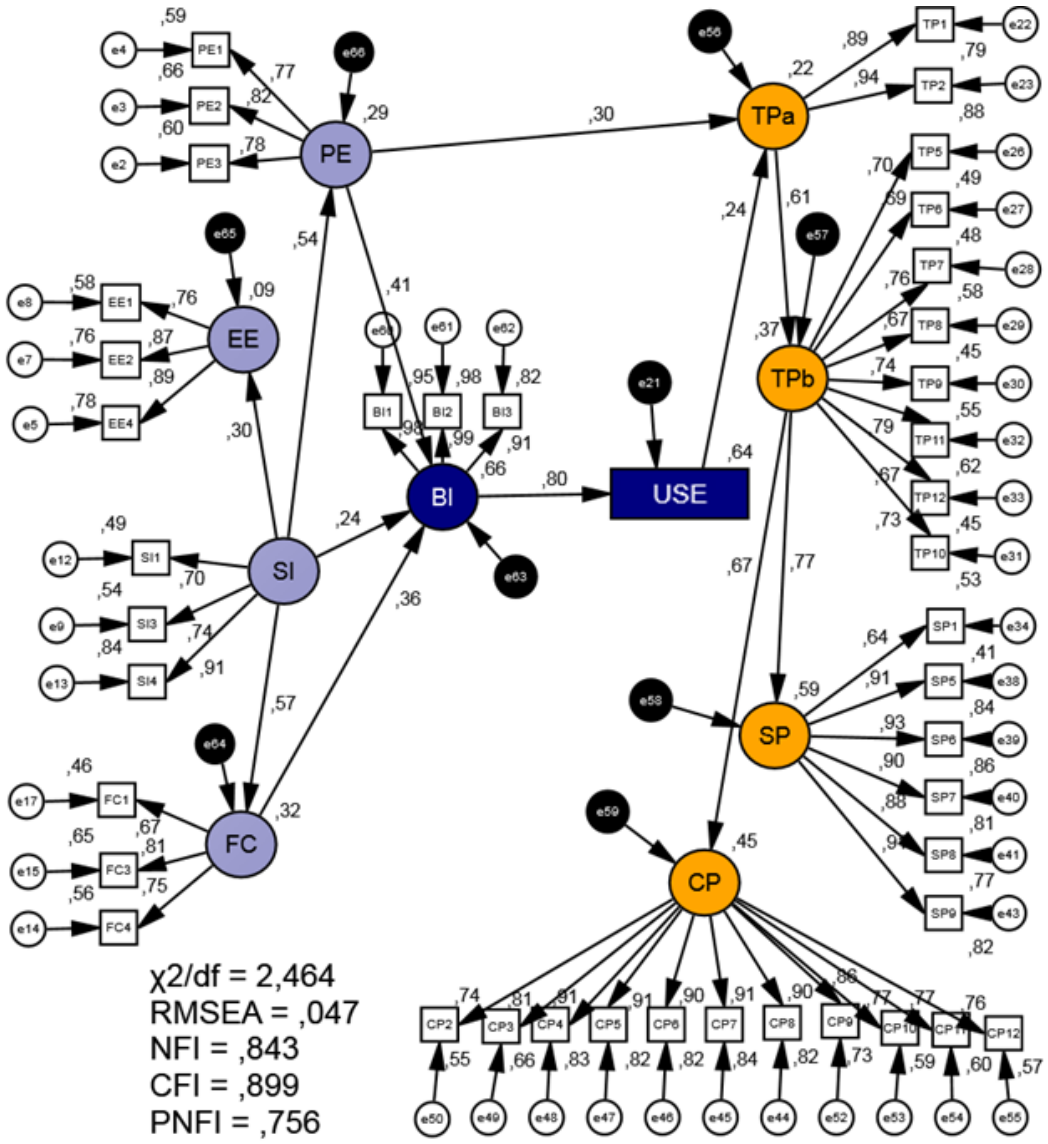

Figure 4: Modified structural model

In the modified model, too, the behavioral intention construct is dependent on performance expectancy and social influence, but the relation to effort expectancy has been eliminated, and the relation to facilitating conditions has been added. *Social influence* is the only exogenous latent construct in the model which has a moderate influence on *facilitating conditions* (β = 0.568) and *performance expectancy* (β = 0.537), while it also explains – together with these two endogenous constructs – 65.7% of the variance of the behavioral intention construct. The strongest influence on behavioral intention is exerted by performance expectancy (β = 0.414).
Effort expectancy or ease of e-learning environment use did not prove to be important for either behavioral intention or actual use behavior. It was only found that use is mostly influenced by the environment, which are the viewpoints of important individuals in the e-learning environment (β = 0.297), but this cannot adequately explain the variability of *the effort expectancy construct* (8.8%).

Table 4: Relation characteristics in the modified structural model

Relation		β	R^2
SI →	PE	0.537***	0.289
SI →	EE	0.297***	0.088
SI →	FC	0.568***	0.323
SI →	BI	0.24***	0.657
FC →		0.361***	
PE →		0.414***	
BI →	USE	0.801***	0.642
USE →	TPa	0.242***	0.222
PE →		0.297***	
TPa →	TPb	0.612***	0.375
TPb →	SP	0.769***	0.591
TPb →	CP	0.668***	0.446

Note. → Direction of path; β – standardized regression coefficient; R2 – R squared, the coefficient of determination; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

The primary exogenous constructs explain 64.2% of the variance of the use behavior construct indirectly through behavioral intention. Besides, use frequency has a statistically significant influence on the teaching presence, which relates to designing and organizing learning, although the relation is weak ($\beta = 0.242$). At the same time, this section of teaching presence is also influenced by performance expectancy ($\beta = 0.297$) or expected benefit of e-learning environment use, which is a better predictor of organizing and designing learning. Together, they explain only 22.2% of the variability of this construct, which leaves 77.8% of the variance to be explained by other factors, which our model does not include. In such a model, structuring the relation between use frequency and the teaching presence which relates to facilitating discussion and direct instruction (TPb) does not appear to be statistically significant; however, this teaching presence is related to the previous (TPa), which explains 37.5% of its variance and has a moderate influence on it (β=0.612). The relations between designing and organizing learning (TPa), social presence, and cognitive presence do not prove to be statistically significant. Nevertheless, we do conclude that the teaching presence which relates to direct instruction and facilitating discussion (TPb) has a statistically significant and relatively strong influence on social presence ($\beta = 0.769$) and cognitive presence ($\beta = 0.668$).

DISCUSSION

Determinants of LMS use

In our study, we examined how acceptance and use of the learning management system (LMS) among teachers at the University of Ljubljana influences their approaches to teaching online. The main purpose of the article is to demonstrate the cause-and-effect relationships between teachers' use of LMS and the realization of various pedagogical aspects of education as represented in CoI model (Garrison et al., 2000). In order for us to answer the research questions, we used two well-formed and empirically validated models that tested the acceptance and use of the LMS and the presence of pedagogical dimensions in online learning.

Performance expectancy

Our results indicate that the usefulness of LMS (measured as performance expectancy) was the main predictor of acceptance of LMS. These results conform to other studies that showed that the increase in perceived usefulness leads to greater intention to use learning technology (Pynoo et al, 2011; Wang & Wang, 2009). Pynoo et al. (2011) actually reported that performance expectancy was (along with social influence) the main reason for digital learning environment acceptance. Teachers' use of technology for teaching can be seen also through as their cost-benefit analysis (Howard, 2013). She found out that their decisions might originate from risk perception and uncertainty in which they appraise technology integration (Howard, 2013). It is interesting that PE was mostly influenced by the social influence construct.

Effort expectancy

We found that ease of use (EE) is not a major determinant of intention to use e-learning environment (BI). This result contradicts to findings of Gupta et al. (2008) or Venkatesh et al. (2003), who found positive impact of EE on BI. Our results are therefore more consistent with Gruzd, Staves, and Wilk (2012) and Pynoo et al. (2011),

who reported no or even negative impact of EE on BI. A greater impact on accepting the e-learning environment is a belief in the usefulness of its use (PE). We can suspect that this is because modern LMS environments are already very user-friendly and effort expectancy among digitally literate teachers is generally low.

Social influence

The demonstrated social influence (SI) leads us to believe that it has a significantly greater role in accepting the LMS as a tool to conduct online learning than might be gathered from the theoretical model. The results of our study showed that SI directly influences acceptance of LMS use, with no direct influence to actual use. This is congruent with Venkatesh's theoretical model (2003) and confirmed by other empirical studies. The social influence construct appears in our model as an indirect and direct predictor of LMS acceptance. The social environment first influences views of usefulness of use and then the perceptions of the adequacy of one's conditions for LMS use. These findings were consistent with previous studies that showed that social environment and perceived ease of use increased perceived usefulness of web-based learning system (Wang & Wang, 2009). These two constructs indirectly influence LMS acceptance. These findings are aligned with other studies that revealed that higher levels of social presence determine teacher's engagement in use of ICT or LMS tools (Pynoo et al., 2011). Social environment is the biggest influence on the perceptions of individuals' available resources for LMS use – on perceiving the adequacy of LMS software and hardware and the necessary expertise. The social environment, thus, is where the use of LMS begins. Namely, the more the social environment supports LMS use, the more it is recognized as a useful tool for teaching.

Facilitating conditions

Facilitating conditions turn out to be another influential factor in accepting the LMS (BI), although the original theoretical model (UTAUT) does not anticipate them as such (Venkatesh et al., 2003). In our modified model, facilitating conditions are not directly related to use behavior, but they reflect individuals' views on whether they have the basic resources required for use. The higher the individual's belief that he or she has the knowledge and equipment to use the LMS, the higher its acceptance will be. Our findings support findings from Venkatesh et al. (2012) in his UTAUT2 model that facilitating conditions directly influence behavioral intention.

Behavioral intention

E-learning environment use acceptance (BI) turns out to be a good predictor of actual use – we found that the more an individual favors the use of the LMS as a tool for online learning, the more frequently he or she will use it. This finding is congruent with other empirical validation UTAUT model (Lee et al., 2010; Venkatesh et al., 2003).

Determinants of teacher presence in online classroom

The second research question of our study deals with the frequency of LMS use and its impact on the formation of teacher presence as defined in the CoI model. The results of structural modeling revealed that LMS use is only a partial predictor of realizing pedagogical aspects of learning in an online learning environment – only when we compare daily and weekly use frequency with monthly and yearly use frequency. We cannot expect that in LMS use, which occurs only once per year, we could look after, say, social contacts among the participants and teacher in the same manner we would with weekly or daily use. Use frequency, thus, directly influences only the organizational aspect of teacher's presence (TPa) in the LMS.

One of the interesting research findings concludes that perceived usefulness (PE) of LMS use has an even stronger influence on the organizational aspect of online learning than use frequency. These findings are congruent with similar studies that confirmed the influence of usefulness and ease of use with respect to the intention to use an LMS (Motaghian et al., 2013; Schoonenboom, 2014). We think this is not accidental, since learning design and organization via the LMS depends largely on the characteristics of an LMS. Thus, if someone believes that the LMS allows him or her to carry out the most fundamental activities related to education (i.e., organizational activities) he or she will better assess the usefulness of the tool. The characteristics of learning activity design and organization also point to another dimension of teaching that is related to facilitating discussion, giving instructions, and direct instruction. We conclude that learning design and organization have an important role in direct instruction and giving instructions to online learning participants and in facilitating discussion among them, but they have no influence on the social and cognitive presence of a community of inquiry.

Our findings also show that social presence—that is, enabling participants' emotional expression, communication, and building group cohesion—is strongly influenced by teaching presence, which is related to

facilitating discussion, giving instructions, and direct instruction. This means that the more the LMS enables teachers to conduct learning activities, the more cohesive student groups will be, the more open communication among them will be, and the more they will be enabled to express emotions. This is also true – to a slightly lesser degree, but still exemplarily – of cognitive presence, which also depends on teaching presence. These results confirm some previous validation of CoI framework and emphasize the centrality of teaching presence (Arbaugh et al., 2008; Garrison, Cleveland-Innes, & Fung, 2010; Kozan & Richardson, 2014; Shea & Bidjerano, 2009).

Our study showed that social presence does not influence other dimensions of the framework, which is aligned with many other studies that found that social presence does not affect cognitive presence. Annand (2011) notes that this suggested social presence is not a crucial part of achieving higher-level learning and may also be achieved through other interactions in the e-learning environment (Díaz et al., 2010; Gorsky & Blau, 2009; Shea & Bidjerano, 2009).

Limitations and directions for further research

This study has some limitations. Since the UTAUT theoretical model is used to predict the acceptance of all sorts of technology, we think it is conceived too broadly to capture the specifics of the e-learning environment. If we were to conceive a conceptual model, which would explain LMS acceptance to a greater extent, as well as its use, we should supplement it with the factors that relate to education. The share of unexplained variance of e-learning environment acceptance and use is lower than in the theoretically presupposed model, which suggests that there are a number of other factors which we have not encompassed, but could explain e-learning environment acceptance. Future research into e-learning environment acceptance and use will have to focus on the identification of these influences.

One of study's limitations include nonprobability sampling: due to collection of data via web survey, our research study did not include individuals who are not keen on using modern technologies. Should we wish to ensure probability sampling and a more representative sample, we would have to collect data differently. In comparison with an online survey, however, this would be more expensive and logistically more demanding. Nevertheless, it is necessary that the section of population who does not favor new technologies should be included in research during the phase of introducing online or blended learning into faculties.

CONCLUSION

The main purpose of our research study was to develop a conceptual model that would expand our understanding of pedagogical aspects of teachers' activities in virtual classroom (LMS) with determinants of the technology use model. We can conclude that the research findings matched our expectations. They point to both the advantages and disadvantages of blended learning, which does not mean that the opportunities this learning provides cannot be used to a larger degree. We think that the more frequent use of LMS by faculty can certainly be achieved by influencing teachers' attitudes toward such use with a greater institutional promotion and direction. Consequently, that would have a positive impact on the provision teachers approaches in LMS, as well as on their quality.

The model of accepting and using the LMS as technological support for online learning offers a useful tool especially during the introductory phases. However, the phase of introducing online learning is only a transition phase, and must be followed by a focus on the quality of online learning. The quality of online teaching as a long-term process is, therefore, an area that will have to receive special attention in the future.

REFERENCES

Anderson, T., Rourke, L., Garrison, D. R., & Archer, W. (2001). Assessing teaching presence in a computer conferencing context. *Journal of Asynchronous Learning Networks*, *5*(2). Retrieved March 12, 2012, from http://auspace.athabascau.ca/bitstream/2149/725/1/assessing_teaching_presence.pdf

Annand, D. (2011). Social presence within the community of inquiry framework. *The International Review of Research in Open and Distributed Learning*, *12*(5), 40–56.

Arbaugh, J. B., Cleveland-Innes, M., Diaz, S. R., Garrison, D. R., Ice, P., Richardson, J. C., & Swan, K. P. (2008). Developing a community of inquiry instrument: Testing a measure of the Community of Inquiry framework using a multi-institutional sample. *The Internet and Higher Education*, *11*(3–4), 133–136. http://doi.org/10.1016/j.iheduc.2008.06.003

Baz, E.H. (2016). Attitudes of Turkish EFL Student Teachers towards Technology Use. *The Turkish Online Journal of Educational Technology, 15*(2), 1-10.

Davis, F. D. (1993). User acceptance of information technology: system characteristics, user perceptions, and behavioral impacts. *International Journal of Man-Machine Studies*, *38*(3), 475–487. http://doi.org/10.1006/imms.1993.1022

Díaz, S. R., Swan, K., Ice, P., & Kupczynski, L. (2010). Student ratings of the importance of survey items, multiplicative factor analysis, and the validity of the community of inquiry survey. *The Internet and Higher Education*, *13*(1–2), 22–30. http://doi.org/10.1016/j.iheduc.2009.11.004

Dillon, A., & Morris, M. (1996). User Acceptance of Information Technology: Theories and Models. In M. Williams (Ed.), *Annual Review of Information Science and Technology* (Vol. 31, pp. 3–32). Medford NJ: Information Today.

Fornell, C., & Larcker, D. F. (1981). Evaluating Structural Equation Models with Unobservable Variables and Measurement Error. *Journal of Marketing Research*, *18*(1), 39–50. http://doi.org/10.2307/3151312

Garrison, D. R., Anderson, T., & Archer, W. (2000). Critical Inquiry in a Text-Based Environment: Computer Conferencing in Higher Education. *The Internet and Higher Education*, *2*(2–3), 87–105. http://doi.org/10.1016/S1096-7516(00)00016-6

Garrison, D. R., Anderson, T., & Archer, W. (2001). Critical thinking, cognitive presence, and computer conferencing in distance education. *American Journal of Distance Education*, *15*(1), 7–23. http://doi.org/10.1080/08923640109527071

Garrison, D. R., Anderson, T., & Archer, W. (2010). The first decade of the community of inquiry framework: A retrospective. *The Internet and Higher Education*, *13*(1–2), 5–9. http://doi.org/10.1016/j.iheduc.2009.10.003

Garrison, D. R., & Arbaugh, J. B. (2007). Researching the community of inquiry framework: Review, issues, and future directions. *The Internet and Higher Education*, *10*(3), 157–172. http://doi.org/10.1016/j.iheduc.2007.04.001

Garrison, D. R., Cleveland-Innes, M., & Fung, T. S. (2010). Exploring causal relationships among teaching, cognitive and social presence: Student perceptions of the community of inquiry framework. *The Internet and Higher Education*, *13*(1–2), 31–36. http://doi.org/10.1016/j.iheduc.2009.10.002

Gorsky, P., & Blau, I. (2009). Online Teaching Effectiveness: A Tale of Two Instructors. *The International Review of Research in Open and Distributed Learning*, *10*(3). Retrieved January, 10 2016, from http://www.irrodl.org/index.php/irrodl/article/view/712

Gruzd, A., Staves, K., & Wilk, A. (2012). Connected scholars: Examining the role of social media in research practices of faculty using the UTAUT model. *Computers in Human Behavior*, *28*(6), 2340–2350. http://doi.org/10.1016/j.chb.2012.07.004

Gupta, B., Dasgupta, S., & Gupta, A. (2008). Adoption of ICT in a government organization in a developing country: An empirical study. *The Journal of Strategic Information Systems*, *17*(2), 140–154. http://doi.org/10.1016/j.jsis.2007.12.004

Hair, J. F. J., Black, W. C., Babin, B. J., & Anderson, R. E. (2009). *Multivariate Data Analysis* (7th ed.). Upper Saddle River, NJ: Pearson.

Halverson, L. R., Graham, C. R., Spring, K. J., Drysdale, J. S., & Henrie, C. R. (2014). A thematic analysis of the most highly cited scholarship in the first decade of blended learning research. *The Internet and Higher Education*, *20*, 20–34. http://doi.org/10.1016/j.iheduc.2013.09.004

Hermans, R., Tondeur, J., van Braak, J., & Valcke, M. (2008). The impact of primary school teachers' educational beliefs on the classroom use of computers. *Computers & Education*, *51*(4), 1499–1509. http://doi.org/10.1016/j.compedu.2008.02.001

Howard, S. K. (2013). Risk-aversion: understanding teachers' resistance to technology integration. *Technology, Pedagogy and Education*, *22*(3), 357–372. http://doi.org/10.1080/1475939X.2013.802995

Kozan, K., & Richardson, J. C. (2014). Interrelationships between and among social, teaching, and cognitive presence. *The Internet and Higher Education*, *21*, 68–73. http://doi.org/10.1016/j.iheduc.2013.10.007

Lee, C.-L., Yen, D. C., Peng, K.-C., & Wu, H.-C. (2010). The influence of change agents' behavioral intention on the usage of the activity based costing/management system and firm performance: The perspective of unified theory of acceptance and use of technology. *Advances in Accounting*, *26*(2), 314–324. http://doi.org/10.1016/j.adiac.2010.08.006

Lei, J., & Zhao, Y. (2007). Technology uses and student achievement: A longitudinal study. *Computers & Education*, *49*(2), 284–296. http://doi.org/10.1016/j.compedu.2005.06.013

Lipman, M. (2003). *Thinking in education* (2nd ed). New York: Cambridge University Press.

Mažgon, J., Kovač Šebart, M., & Štefanc, D. (2015). The Role and Use of E-Materials in Vocational Education and Training: The Case of Slovenia. *The Turkish Online Journal of Educational Technology. 14*(4), 157-164.

Motaghian, H., Hassanzadeh, A., & Moghadam, D. K. (2013). Factors affecting university instructors' adoption of web-based learning systems: Case study of Iran. *Computers & Education*, *61*, 158–167. http://doi.org/10.1016/j.compedu.2012.09.016

Mumtaz, S. (2000). Factors affecting teachers' use of information and communications technology: a review of the literature. *Journal of Information Technology for Teacher Education*, *9*(3), 319–342. http://doi.org/10.1080/14759390000200096

Pardales, M. J., & Girod, M. (2006). Community of Inquiry: Its past and present future. *Educational Philosophy and Theory*, *38*(3), 299–309. http://doi.org/10.1111/j.1469-5812.2006.00196.x

Pynoo, B., Devolder, P., Tondeur, J., van Braak, J., Duyck, W., & Duyck, P. (2011). Predicting secondary school teachers' acceptance and use of a digital learning environment: A cross-sectional study. *Computers in Human Behavior*, *27*(1), 568–575. http://doi.org/10.1016/j.chb.2010.10.005

Radovan, M., & Dinevski, D. (2012). Digitalne razlike in e-izobraževanje [Digital divide and e-education]. *Andragoška Spoznanja, 18*(4), 37-44. https://doi.org/10.4312/as.18.4.37-44

Schoonenboom, J. (2014). Using an adapted, task-level technology acceptance model to explain why instructors in higher education intend to use some learning management system tools more than others. *Computers & Education*, *71*, 247–256. http://doi.org/10.1016/j.compedu.2013.09.016

Shea, P., & Bidjerano, T. (2009). Cognitive presence and online learner engagement: a cluster analysis of the community of inquiry framework. *Journal of Computing in Higher Education*, *21*(3), 199–217. http://doi.org/10.1007/s12528-009-9024-5

Stefl-Mabry, J. (1999). Professional staff development: Lessons learned from current usability studies. *Journal of Information Technology Impact*, *1*(2), 81–104.

Venkatesh, V., Morris, M. G., Davis, G. B., & Davis, F. D. (2003). User acceptance of information technology: Toward a unified view. *MIS Quarterly*, *27*(3), 425–478.

Venkatesh, V., Thong, J. Y. L., & Xu, X. (2012). Consumer Acceptance and Use of Information Technology: Extending the Unified Theory of Acceptance and Use of Technology. *MIS Quarterly*, *36*(1), 157–178.

Wichadee (2015). Factors Related to Faculty Members' Attitude and Adoption of a Learning Management System. *The Turkish Online Journal of Educational Technology. 14*(4), 53-61.

Wang, W.-T., & Wang, C.-C. (2009). An empirical study of instructor adoption of web-based learning systems. *Computers & Education*, *53*(3), 761–774. http://doi.org/10.1016/j.compedu.2009.02.021

Wong, K.-T.; Hamzah, M.S.G, Goh, P.S.C., & Yeop, M.A. (2016). Blended E-Learning Acceptance as Smart Pedagogical Tools: An Initial Study in Malaysia. *The Turkish Online Journal of Educational Technology, 15*(4), 25-31.