



Exploring Preservice Teachers' Perspectives Toward Online Learning: An Intervention of Technology Acceptance Model

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Abstract

E-learning impacted positively on both teachers and students in term of the tenacity to learning and training, and their perceived attitudes toward e-learning environment. The purpose of this paper is to examine behavior of pre-service teachers toward the use of e-learning in a social science subject via technology acceptance model. The dimensions explored were perceived usefulness (PU), perceived ease of use (EU) and their influences on satisfaction (SN) and intention to use (IN) an online modern LMS named Course Networking (thecn.com). Data were elicited via survey approach and analyzed quantitatively to support the investigation. The study involved 69 pre-service teachers pursuing Bachelor of Education program in a public university in Sabah, East Malaysia. The results revealed that there was moderate level of acceptance in the observed PU (mean = 3.82), EU (mean = 3.52), SN (mean = 3.35), and IN (mean = 3.82). A further examination on the relationships showed that PU influenced the intention to use online courses strongly ($r = 0.63$), and on the other hand, EU also had strong influence on SN ($r = 0.68$). As predicted, the mean score for PU (3.82) was higher than EU (3.52). The study implicated that the design, pedagogical and navigational aspects of a course are important to obtain good SN and IN scores from the users.

Keywords: Perceived Usefulness; Perceived Ease of Use; Satisfaction; Intention to Use; e-Learning; Acceptance of Technology

1. Introduction

E-learning is considered as a catalyst for today's educational institutions purposes and students' demands (Wilfred, 2016). E-learning involves the use of internet to improve the quality of learning via various resources. E-learning provides learners with personalized and self-directed learning via various online engagements for gaining knowledge. It helps learners' to retend learning, attention, and motivation in online learning (Ozdamli and Uzunboylu, 2014).

Online learning such as "just-in-time" learning is popular nowadays due to its flexibility in accessing learning materials at anywhere and anytime (Pena-Ayala et al., 2014). The increase growth of e-learning needs especially in developing countries prompts for the need to research on the factors that affect the adoption of e-learning such as quality, satisfaction and the intention to use it. With the regards to e-learning adoption, many researchers used the technology acceptance model (TAM) as the foundation for studying the factors of adopting e-learning systems.

This study will investigate the level of technological acceptance via components in the model of TAM by Davis (1989; 1993). It attempts to fill a research gap by addressing the influence of perceived usefulness (PU) and perceived ease of use (EU) on the quality features of an e-learning system (a social science course) that uses online collaboration and interaction which was measured via satisfaction (SN) and the intention to use (IN) the online course for e-learning. The research questions are:

1. What are the pre-service teachers' level of PU, EU, SN and IN towards online learning in a social science course?

2. Are there influences of PU and EU on pre-service teachers' SN and IN in a social science course?

2. Literature Review

2.1. E-learning

The use of Information and Communication Technology (ICT) for educational purposes increased rapidly in the 21st century and has changed the scope of education radically (Hsu et al., 2013). E-learning can be defined as electronic devices such as mobile computers that serve as technological mediating tools for creating readily available information online for effective interactions and learning.

E-learning is considered as online learning because internet is used for the interactions between the learners and the instructor. E-learning is used mainly for sharing resources and learners' contributions and efforts to achieve greater success in learning. Therefore, understanding the learners' perceptions of adopting e-learning systems in schools, colleges and universities will provide knowledge of the intention for using e-learning.

2.2. TAM

The TAM was first proposed by Davis (1989; 1993). The theory of TAM explains how the ways learners accept and use a new e-learning system. When encountering a new technology, the TAM Model looks at the learners' decisions on using it and the ways it is used. TAM studies two factors, namely PU and EU. TAM explores the behaviors of the learners by analyzing the positive or negative behavior when adopting the new technology.

In the TAM model, two main factors that are discussed are:

- a. PU and the usual question asked are "In what ways can my productivity or performance be enhanced by the e-learning system?"
- b. The level of difficulties while using the e-learning system is often referred as the EU.

Therefore, the widespread use of the TAM's model for exploring learners' behavior will enable us to predict and understand the levels of e-learning acceptance especially new technology.

2.3. PU

According to Davis (1993), PU is defined as the learners' perceptions regarding the outcome of the experience after using the e-learning system. If a new technology is useful and effective, it will enhance or improve the learners' job performance.

According to Shroff et al. (2011), a system with a sound quality online learning materials determined the positive PU of an e-learning system. For example, build in more multimedia features to attract learner's attention and create responsiveness of teachers to learners' queries will increase the level of PU of the system.

2.4. Perceived EU

According to Donkor (2011), EU is the degree to which a new technology is easily understood or used. It is also regarded as how much lack of effort that is needed by the learner to adopt the new technology. In other words, the degree to which users perceive a new product as better than its substitutes is known as EU (Davis, 1989).

2.5. Influence of PU and perceived EU on attitudes toward E-learning

Many researches showed that PU and EU influenced the ways how learners accept a new innovation or system (Wilfred, 2016). The results of these researches indicated that high level of EU would result greater intention to use and implement the system.

PU will affect whether a user intends to use a new technology. It can be said that technology that is more innovative, user-friendly and give them greater freedom will see user's PU, EU and satisfaction higher. The quality of online learning for learning must be well-designed to achieve the highest quality. According to study by Zacharis (2012), the good quality of e-learning services, together with high level of PU and EU would positively affect learners' intentions to use the innovation. This was supported by Shroff et al. (2011) whose findings proved that the good quality of a web-based product significantly influenced learners' satisfaction in the product. He further said that this would give a significant effect on PU of the innovation. Hence, the conclusion is the level of user satisfaction is a factor that can determine user's intention toward the use of any e-learning product.

There is a need for long-term measurement of PU for any new innovation under study because it would affect long-term users' intention to use the innovation. This point was supported by Wilfred (2016) who stated that there was a positive influence of PU and EU toward user satisfaction.

3. Method, Instrumentation, and Sampling

This is a quantitative study using the survey method to elicit data from respondents. A survey is defined as a brief interview, discussion with individuals or asking questions of respondents about a specific topic to collect information. Survey research was often used to assess thoughts, opinions, and feelings (Shaughnessy et al., 2011). This study used questionnaires via a series of close-ended questions. This was done via the group administered questionnaire approach to ensure high response rate. If the respondents were unclear about the meaning of a question, they could ask for clarification.

The questionnaire used was adopted from the TAM by Davis (1989) to investigate respondents' perception related to PU (9 items), perceived ease-of-use (6 items), satisfaction (3 items) and intention to use (3 items). The researcher defined school teachers' attitudes toward online learning in a social science course as both the satisfaction of the users and the intention to use online learning (6 items). All the items are scored using a 5-point Likert Scale. The alpha cronbach reliability for the constructs in this study is shown in Table 1.

Other researchers reported alpha cronbach reliability for PU as 0.95 (Shroff et al., 2011) and 0.89 (Maslin Masrom, 2007), respectively, while perceived ease-of-use (EU) was reported as 0.95 (Shroff et al., 2011) and 0.93 (Moon and Kim, 2001), respectively.

This study involved 69 students taking bachelor of education in social science. They took a 14-week multimedia course which provided them with skills on designing and developing multimedia-based online learning materials with of the support of web 2.0 technology. After attending 7 weeks of lessons and hands-on sessions, each group of between 3 and 4 students began materials development. Each group leader nominated students from any other three groups to use and assess their developed materials beginning Week 11. On Week 14, the survey was given to them all students for their feedbacks. Quantitative data were analyzed using statistical test via SPSS Version 21. The type of statistical tests is shown in Table 2.

This study also adopted the guidelines for establishing relationship according to Fraenkel and Wallen (2006) as shown in Table 3.

To analyze the level of PU, EU, satisfaction, intention to use and attitudes toward online learning, the study would report using three levels namely high, moderate and low. The range is the difference

Table 1: Reliability coefficients of the TAM's constructs

Constructs	Alpha cronbach
PU	0.81
EU	0.68
SN	0.56
IN	0.84
Attitude toward online learning (ATT)	0.78

PU: Perceived usefulness, EU: Ease-of-use, SN: Satisfaction, IN: Intention to use, TAM: Technology acceptance model

between the highest and the lowest values in a normal distribution (Gravetter and Wallnau, 2012). The formula for range is:

$$\text{Range} = (\text{Maximum value} - \text{minimum value})$$

This study divided PU, EU, satisfaction, intention to use and attitudes toward online learning to three level, hence each level would be equally separated by the range/3 and are shown in Table 4.

4. Findings and Discussion

4.1. Pre-service teachers’ level of PU, perceived EU, satisfaction and intention to use toward online learning

The survey on preservice teachers using the TAMs questionnaires produced positive results on their attitudes toward online learning. The 69 respondents were undergraduates who are pre-service teachers from the Faculty of Psychology and Education majoring in social science subjects (history and geography). Based on Table 4 for interpreting the mean scores, the levels of the perceptions for PU, EU, satisfaction and intention to use toward online learning are shown in Table 5.

Table 5 shows that the PU mean scores of the 69 respondents was 3.82 (SD = 0.42) and were at moderate level. The mean scores for EU were 3.52 (SD = 0.54) and were also at moderate level. The mean scores on SN and IN were 3.35 (SD = 0.58) and 3.82 (SD = 0.42), respectively, and were also at moderate level.

Table 2: Data analysis techniques

Research question	Type of test
What are the pre-service teachers’ level of perceived usefulness, perceived ease of use, satisfaction and intention to use toward online learning in a social science course?	Descriptive statistics (percentage, mean and standard deviation)
Are there influences of perceived usefulness and perceived ease-of-use on pre-service teachers’ satisfaction and intention to use in a social science course?	Correlation test (Pearson)

Table 3: Relationship according to correlation values

Correlation index	Relationship interpretation
0.00-0.19	Very weak, very low
0.20-0.39	Weak, low
0.40-0.69	Moderate
0.70-0.89	Strong, high
0.90-1.00	Very strong, very high

Source: Fraenkel and Wallen (2006)

Table 4: Values for the three levels for PU, EU, SN, IN and ATT

Constructs	Maximum	Minimum	Range	Range/3	Levels		
					Low	Moderate	High
PU	4.89	2.89	2.00	0.67	2.89-3.56	3.57-4.23	4.24-4.89
EU	4.67	2.17	2.50	0.83	2.17-3.00	3.01-3.83	3.84-4.67
SN	5.00	2.00	3.00	1.00	2.00-3.00	3.01-4.00	4.01-5.00
IN	5.00	2.00	3.00	1.00	2.00-3.00	3.01-4.00	4.01-5.00
ATT	4.83	2.17	2.66	0.89	2.17-3.06	3.07-3.95	3.96-4.83

PU: Perceived usefulness, EU: Ease-of-use, SN: Satisfaction, IN: Intention to use

These moderate perceptions on PU, EU, SN and IN found in this study are in agreement with findings from other researchers. For instance, a well-design e-learning system is a big factor that influences user satisfaction. This finding was similar to findings by Wilfred (2016).

The findings clearly indicated that learner satisfaction and intention to use the implemented e-learning could be improved if the quality of the online materials delivery and online services were improved. In other words, users’ attitudes toward online learning would be continuous to be positive if their confidence in the e-learning services could be assured.

4.2. The influences of preservice teachers’ PU and ease-of-use on satisfaction and intention to use online learning

The results of the correlation analysis between PU and SN and EU and SN are shown in Table 6.

According to Table 6, the relationship between PU and SN was considered to be moderate, $r = 0.43$ and was significant at 99% confidence level. The relationship between EU and SN was also reported to be moderate, $r = 0.68$ and was significant at 99% confidence level. The relationship between PU, EU, and SN is shown in Figure 1.

Table 5: Perceived usefulness, ease of use, satisfaction and attitudes towards online learning of the respondents

TAMs constructs	N	Mean scores	SD	Level
PU	69	3.82	0.42	Moderate
EU	69	3.52	0.54	Moderate
SN	69	3.35	0.58	Moderate
IN	69	3.82	0.42	Moderate

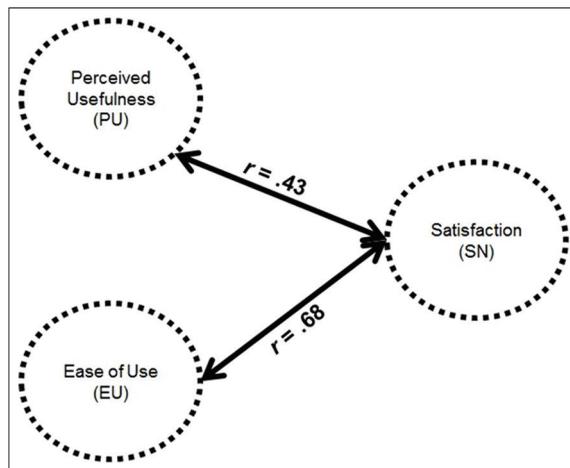
PU: Perceived usefulness, EU: Ease-of-use, SN: Satisfaction, IN: Intention to use, TAM: Technology acceptance model

Table 6: Relationships between PU, EU and SN

Relationships between the TAMs constructs	Pearson correlation (r)	Significance (P<0.01)	Relationships interpretation
PU versus SN	0.43	Significant	Moderate
EU versus SN	0.68	Significant	Moderate

PU: Perceived usefulness, EU: Ease-of-use, SN: Satisfaction, TAMs: Technology acceptance models

Figure 1: Relationship between perceived usefulness, ease-of-use and satisfaction



The findings showed that the quality of the delivery platform and its services were important because they affected PU and EU. These must be maintained consistently because it showed considerable positive influence on SN (the moderate and strong correlation as shown in Figure 1). Zacharis (2012) also proved similar findings on the influence of learner satisfaction towards the usage of e-learning system.

Users' satisfaction was found to be high if the information quality of the e-learning system was high. This fact was supported by Shroff et al. (2011) and Donkor (2011) who discovered that information quality and satisfaction were positively related. Therefore, to maintain a good quality e-learning with the best services, feedback mechanism must be established to make learning process more helpful and engaging.

According to Table 7, there was a moderate relationship between PU and IN, $r = 0.63$ and was significant at 99% confidence level. The relationship between EU and IN was moderate, $r = 0.53$ and was significant at 99% confidence level. The relationship between PU, EU, and SN can be illustrated in Figure 2.

Figure 2 shows that PU and EU did affect the learner's acceptance of online learning implemented in this study. The e-learning provider must provide e-learning services according to the preferences of learners so that learners would be motivated to use it. Learners needed to access interfaces that were easy to use to complete e-learning activities to ensure they could maintain the intention to use the system.

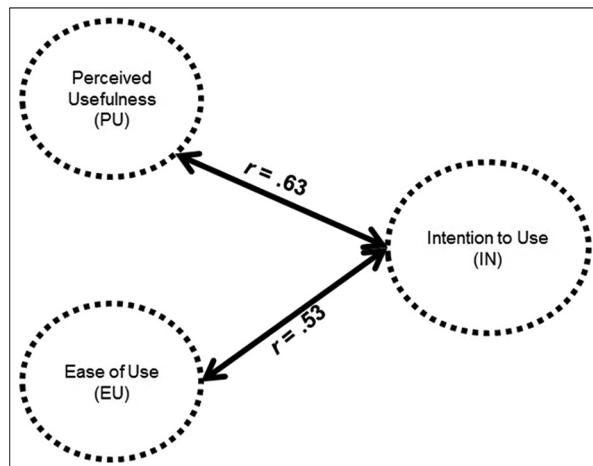
The findings that the service quality of the e-learning influenced the intention to use it were similar to findings by Shroff et al. (2011), Donkor (2011) and Zacharis (2012). Furthermore, Wilfred (2016) had also confirmed that PU affected strongly on the intention to use e-learning. Due to these relationships between PU and EU on SN and IN that were proven in this study and also by other researchers, all e-learning providers should adhere to the quality of the e-learning system and its functions during the planning and designing stages in the future.

Table 7: Relationships between PU, EU and IN

Relationships between the TAMs constructs	Pearson correlation (r)	Significance (P<0.01)	Relationships interpretation
PU versus IN	0.63	Significant	Moderate
EU versus IN	0.53	Significant	Moderate

PU: Perceived usefulness, EU: Ease-of-use, SN: Satisfaction, TAMs: Technology acceptance models

Figure 2: Relationship between perceived usefulness, ease-of-use and intention



5. Recommendation and Conclusion

The study proved that learners' acceptance of an e-learning system for learning depends on many factors especially on the satisfaction factor and also the learners' PU and EU of the system. Student teachers who participated in this study demonstrated and learned ICT-related skills and knowledge previously unknown to them. In teacher education programs, student teachers were taught to devise ICT-based learning materials. However, they had limited opportunities to experience teaching using ICT-based materials in real classrooms. Participation in community projects enabled student teachers to develop pedagogical, technological and content knowledge using the resources available in the community.

According to Jordan (2013), the teachers' way of designing and orienting the online learning experience influenced students' learning behaviors. In other words, a successful e-learning course must be well-designed and engage students with technology. Leeds (2014) suggested that an e-learning program must also cater students who are pioneer users so that they do not experience culture shock that can affect their PU, EU and satisfaction. Therefore, they must design lessons to be effective for online learning to raise the status of user's satisfaction, PU and EU and then only can raise the intention to use the system.

This study proved that learners' perceptions in learning was important for e-learning providers, teachers and lecturers. Therefore, e-learning system in the future must focus along the concepts of users collaboration and networking. Providers must offer hybrid courses which are a blend of face-to-face classroom instruction with web-based learning with automated feedbacks mechanism to maximize learning performance.

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