

Factors affecting the User Satisfaction for e-Learning Systems

Chandrasiri, G.D.T.D.,

University of Sri Jaywardenepura, Sri Lanka

thamali.chandrasiri@sjp.ac.lk

Jayasinghe, J.N.,

University of Sri Jaywardenepura, Sri Lanka

nishika@sjp.ac.lk

Abstract

The use of e-learning system is considered as an important and an integral part of educational process. Developed countries use e-learning systems successfully whereas in Sri Lankan context there is a lack of usage of e-learning systems. In this background, user satisfaction plays an important role and may affect the use of e-learning systems. Therefore, the aim of this study is to find factors affecting the user satisfaction and usage of the e-learning systems and to find out the relationship between those factors. In this study, the Technology Acceptance Model (TAM) was adapted with some other factors which were gathered through the literature. The conceptual model was developed to find the satisfaction of e-learning systems and its use. Identified factors for this model were Information Quality, Computer Self-efficacy, Perceived Ease of Use, Perceived Usefulness and Subjective Norms.

Key words: E-learning, User satisfaction, Technology acceptance model

Introduction

In this era of globalization, knowledge has become the most critical mean for gaining competitive advantage. As a method of acquiring knowledge, learning has become a crucial element (Longworth & Davies, cited in Lee 2006). E-learning is emerging as the new paradigm of modern education and it is growing day by day worldwide (Arbaugh & Duray, 2002). E-learning refers to the methods of learning which uses electronic instructional content and telecommunication technology to deliver information and is a term which has synonyms like web-based or online learning (Trombley & Lee, cited in Lee 2006). E-learning has now become a portable and flexible new method for learners to gain essential knowledge(Lee, 2006). Recently e-learning systems are being introduced in schools, corporations and public sector organizations to increase the effectiveness of learning and to overcome the drawbacks of traditional learning.(Violante, cited in Harrati *et al.* 2016).

According to the literature,e-learning useis growing day by day, while failures also exist. When considering these failures, previous researchers have identified that many users stop their online learning after the initial experience due to numerous reasons which affects user

satisfaction(Sun *et al.*, 2008). There are a number of studies that examined the factors affecting satisfaction and usage of e-learning systems and their relationship(Sun *et al.*, 2008;Delone and Mclean, 2003;Lee, 2006). Though some countries use e-learning systems effectively and widely, we can see a lack of usage in e-learning systems within Sri Lankan context. There may be some causes behind this lack of e-learning usage. Therefore, it is important to have a clear understanding of the factors that have direct impact on the user satisfaction and the indirect impact on usage of the web-based e-learning systems.

According to R. M. G. S. Jayarathna (2016), students do not efficiently and effectively participate in e-learning systems in Sri Lanka and there is a lack of research conducted on e-learning. Sometimes, students or undergraduates may not be aware of e-learning systems available in their institutions. In addition, they may think they are not useful and hard to use. Even though the government has spent a lot of money on e-learning systems to facilitate undergraduates, they do not utilize the resources properly (Suraweera, 2015). Therefore, it is necessary to study this area thoroughly to find the satisfaction factors for using these systems.

Thus, for this study the following research objectives were identified,

- Identify the factors affecting user satisfaction of e-learning systems.
- Analyze the relationship between those factors and the usage of e-learning systems.

Literature Review

E-learning generally refers to the methods of learning which use electronic instructional content delivered via the internet and is a term which is synonymous with Web-based or Online Learning (Trombley and Lee, cited in Lee 2006). There are two groups of theories that can be applied to the e-learning concept. Firstly, learning area which includes, social cognitive or social learning theory (Bandura, cited in Newton 2016). Secondly, the field of information technology and in particular theories such as the Technology Acceptance Model (Davis, 1989). To explain and predict the adoption and use of information technology at work, Davis (1989) proposed the Technology Acceptance Model (TAM) based on the Theory of Reasoned Action (TRA) in 1989. The TAM theorized that perceived usefulness (PU) and perceived ease of use (PEOU) as two key determinants of technology adoption.

According to TAM both perceived usefulness(PU) and perceived ease of use(PEOU) influence the attitude of individuals towards the use of a technology, while attitude and PU predict the individual's behavioral intention (BI) to use the technology (Davis, 1989). Davis referred to PU

as the degree to which individuals expect that the adoption of a particular technology would enhance their job performance, while PEOU was the degree to which individuals believe that using a particular technology would be simple and free of effort (Davis, 1989). TAM depicts that one's actual use of a technology system is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness of the system, and perceived ease of the system. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use (Davis, 1989). Attitude was subsequently omitted from the model by Davis et al. because of its weak correlation with both BI and PU. In this scenario of identifying factors affecting user satisfaction with e-learning, TAM could be useful. The main constructs of TAM; perceived usefulness and perceived ease-of-use predicts user acceptance of course websites (Paul Legrisa, John Inghamb, 2001). TAM was conceived at the individual level when it was originally developed, and research into the influence of subjective norms is one of the major directions for enhancement of TAM (Cheung and Vogel, 2013).

As a model for the prediction of behavioral intentions the Theory of Reasoned Action has been widely used (Ellen and Ajzen, 1992). According to TRA user's behavior. This can be determined by individual's intention to perform or not to perform a behavior. It emphasizes that behavioral intention is the immediate antecedent to behavior. Attitudes and subjective norms influence the intention (Ajzen and Fishbein, cited in Cheung and Vogel 2013). Often the performance of behavior is constrained by the lack of appropriate opportunities, skills and resources. Even if a person has very positive attitudes and norms, he or she may not actually perform a certain behavior because of lack of control over his or her own activities. Due to this reason, the Theory of Planned Behavior is introduced in order to include an additional variable named 'Perceived Behavioral Control' (Cheung and Vogel, 2013). Perceived Behavioral Control has direct and indirect effect on behavior through behavioral intentions. The indirect effect assumes that perceived behavioral control has motivational implications for behavioral intentions (Ajzen, cited in Cheung and Vogel 2013)

Previous researches have used TAM as a model to explain how people adopt and use e-learning. Selim, (cited in Park 2009) emphasized that TAM was needed to investigate web-based learning. As a result, he introduced course website acceptance model (CWAM) to test the relationships between perceived usefulness, perceived ease of use and intention to use with university students. Finally, he concluded that PU and PEOU are good determinants of the

satisfaction. Furthermore, he emphasized the importance of the websites as an efficient way of learning.

Lee, (2006) extended his model based on an extension of the TAM approach. In his model he included constructs and relationships that may be important in the context of e-learning. Constructs included content quality, course attributes, perceived network externality, computer self-efficacy, subjective norm, and a mechanism of competing behavioral intentions to e-learning. According to the author, content quality has two dimensions; 'content richness' and 'update regularity'. Lee emphasized that all these factors have a positive impact on user satisfaction when using e-learning systems.

Another study proposed four key quality assurance factors such as learning process, tutor interaction, peer interaction, and course design to expand the understanding of students' experience in e-learning (Chow and Shi, 2014). Chien, 2012 proposed two types of factors; system factors (functionality, interaction, and response) and instructor factors (attitude, technical skills, and instructional methods) which influence on the effectiveness of e-learning under the interactions of employee computer self-efficacy.

Furthermore, e-learning is useful in the context of collaborative learning. Collaborative environments in education involve small groups of students working together to solve problems with the purpose of learning. Google has several applications such as Google Docs, Google Forms, and Google sites to facilitate collaboration (Rienzo and Han, cited in Cheung and Vogel 2013).

Some studies have identified the factors vital to the e-learning systems as dimensions. They were student, instructor, course, technology, design and environment dimensions. Thirteen factors have been identified under those dimensions. In student dimension, factors were attitude toward computers, learner computer anxiety, and internet self-efficacy. In instructor dimension the factors were instructor response timeliness, attitude towards e-learning, course flexibility and course quality. There were factors such as perceived usefulness and perceived ease of use under design dimension. Finally, diversity in assessment, learner perceived interaction with others were the factors under environmental dimension (Sun *et al.*, 2008). As a recent trend in higher education, e-learning systems provide students with online access and learning content. Reasons for this trend are changes in students' demographic factors, educational delivery market conditions, and innovation technology itself (Concannon *et al.*, cited in Park 2009).

Most of the previous studies related to e-learning are in educational context, generally higher education. However, over the past two decades there was an interest in learning outside the formal educational context. Researchers have identified the importance of work related learning that allows employees to retain with an ever-changing work environment in which emerges technological advancements day by day, and e-learning is seen as a tool to achieve this learning (Cheng *et al.*, cited in Newton *et al.* 2017).

There are three main features of e-learning. They are the ability to interact via computer-mediated communication (CMC), retrieval of large amounts of information, and the processing power of the Java language (Asiri *et al.*, 2012). These facilitate new e-learning technologies called Learning Management Systems (LMSs), like Lotus Note, Moodle, Blackboard and WebCT. A synonym for LMS is Virtual Learning Environments (VLEs) or Course Management Systems (CMSs) (Asiri *et al.*, 2012). Sallum (2012) described LMS as a solution package that deliver and administrate the contents and resources to all students and employees. Thurmond *et al.* (2002) investigated the factors affecting on learner's satisfaction such as age, computer skills, and initial knowledge about e-learning technology, team work, courses taken and various assessment methods. Scheduled discussions and acquaintance with the instructors also affect the learner's satisfaction. In addition, they emphasized that receiving comments in a timely manner and the time that learners must spend on interacting with e-learning affect the satisfaction level.

According to the research conducted by Venkatesh *et al.* (2000) it has been emphasized that social influence, facilitating conditions and behavioral intention are the factors predicting technology used behavior (Venkatesh *et al.*, 2000). Social influence is defined as the degree to which a person perceives that others believe he or she should use the new system. It is important in the early stages of technology usage. Facilitating conditions are defined as the degree to which an individual believes that an organizational and technical infrastructure exists to support the use of the system. In recent studies researchers have examined the effects of social ties on the adoption of information technologies in the virtual environment. Hossain and de Silva (2009) explore user acceptance of technology by considering social ties in social networking systems.

In this study the following aspects were identified as the factors that affect user satisfaction with e-learning systems.

Information Quality

Information quality (IQ) can be defined as the “characteristic of the output offered by the IS, such as accuracy, timeliness and completeness metrics” (Delone and Mclean 2003, p. 15). According to Delone and Mclean (2003), IQ provides greater satisfaction for the users as well as increase the use of the system. Quality of the information is important in determining user satisfaction level with the system, which in turn leads to system utilization. Eom (2012) emphasized that Information quality has a positive relationship with user satisfaction and system use.

Computer Self Efficacy

Computer self-efficacy (CSE) is individual's beliefs regarding their ability to use a computer in the context of IT usage (Compeau & Higgins 1995). Bandura's 1987 study (cited in Lee, 2006) defined CSE as “people's judgment of their ability to perform specific tasks”. Lent et al. revealed that higher levels of self-efficacy lead to better learning performance. If a user is confident with his IT related knowledge and abilities, he will tend to use new technology and systems more and more. Compeau et al., (1999) introduced three dimensions of computer self-efficacy; ‘magnitude’, ‘strength’ and ‘generalizability’. Learner internet self-efficacy positively affects perceived e-learner satisfaction with e-learning. (Pei-Chen Sun et al. 2006; Eom, 2014).

Perceived Usefulness

The perceived usefulness of a system is defined as “to what extent individuals believe that their performance will enhance by using the technology” (Davis, 1989). Numerous empirical studies have investigated that PU as the primary predictor of information technology usage. (Davis et al 1992). Students will use e-learning systems only if they feel that its use will enhance their performance. Perceived usefulness significantly correlates with the usage of systems (Davis, 1989). Lee (2006) emphasized that perceived usefulness positively affects the intention of users to accept e-learning systems (Lee, 2006; Al-Alak and Alnawas, 2011).

Perceived Ease of use

Perceived ease of use (PEOU) has a positive correlation with the behavioral intentions to use systems. Davis (1989) defined PEOU as “the degree to which an individual feel that using a particular technology will be free of effort”. The less effort in using a system leads for better

performances. In the e-learning context, this PEOU can be described as the degree to which a student believes that electronic learning system(ELS) will be easy to use and free from effort (Davis 1989). The results of many empirical studies have also indicated that perceived ease of use has a positive impact on user satisfaction with ELS.(Lee, 2006;Park, 2009;Sun *et al.*, 2008)

Subjective Norms

In TRA model, Fishbein and Ajzen (1975), social influence was tested on behavioral intention. They emphasized that a person thinks that he should or should not perform a behavior to a social referent. These referents may be parents, teachers, friends, classmates, etc.(Taylor and Todd, 1995). For example, if a teacher believes his/her students should use e-learning systems that students may strongly motivate to comply with the expectations of the teacher and they tend to use e-learning systems more and more. On the other hand, if a referent believes students should not use those systems, then those students are strongly demotivated to use those systems. Subjective norm will have a positive direct effect on intention to use when the ELS use is perceived to be mandatory(Lee,2006).Park (2009) emphasized that university students' attitude towards e-learning is affected by subjective norms.

User Satisfaction

User satisfaction is a key indicator of deciding whether learners would continue to adopt a learning system or not. It refers to “the degree of perceived learner satisfaction towards e-Learning environment” (Pei-Chen Sun *et al.*, 2006).The former researchers defined this as “the extent to which users believe the information system available to them that meets their information requirements”(Ives *et al.*,cited in Eom 2014, p. 10). Eom (2012)also indicated that there is a positive relationship between user satisfaction and system use.

Based on the above discussion,the following research model and hypothesis have been developed to achieve research objectives. Further, questionnaire items also have been developed and it is available in Appendix.

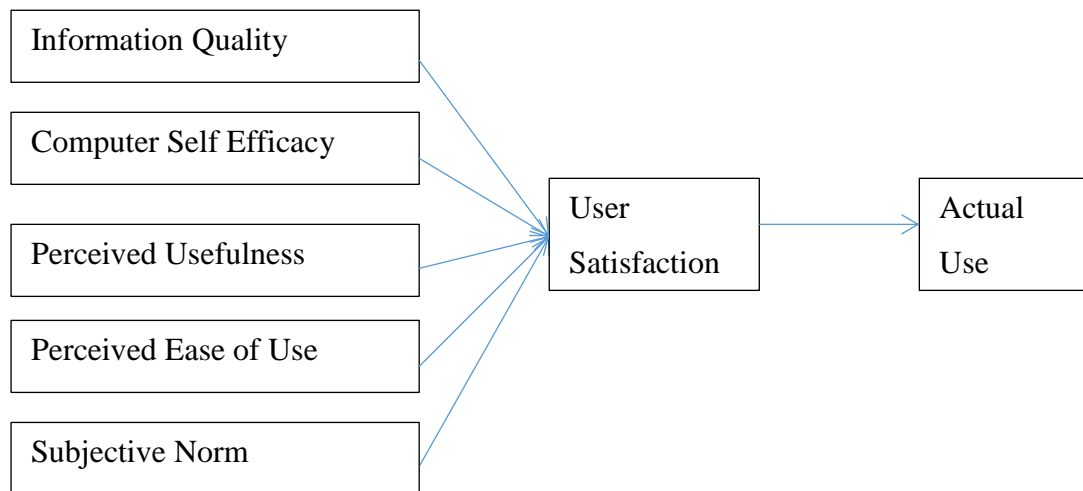


Figure 1: Coceptual Framework

H1: Information quality has a positive direct effect on user satisfaction.

H2: Computer self-efficacy has a positive direct effect on user satisfaction.

H3: Perceived usefulness has a positive direct effect on user satisfaction.

H4: Perceived ease of use has a positive direct effect on user satisfaction.

H5: Subjective norms have a positive direct effect on user satisfaction.

H6: User satisfaction has a positive direct effect on actual use.

H7: Information quality has a positive indirect effect on actual use.

H8: Computer self-efficacy has a positive indirect effect on actual use.

H9: Perceived usefulness has a positive indirect effect on actual use.

H10: Perceived ease of use has a positive indirect effect on actual use.

H11: Subjective norms has a positive indirect effect on actual use.

Conclusion

In this study, it has been emphasized the factors affecting user satisfaction and usage for e-learning systems. The research model has been developed based on the Technology Acceptance Model and several empirical studies. Identified factors are information quality, computer self-efficacy, perceived ease of use, perceived usefulness and subjective norms. The hypotheses

have been built by referring to the literature. It has been hypothesized that all above factors have a direct impact on user satisfaction and an indirect effect on actual use.

Questionnaire items also have been developed based on research literature. The researcher is planning to study this research further by analyzing data which will be collected from undergraduates of the University of Sri Jaywardenepura, Sri Lanka.

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Appendix

Operationalization

Code	Factor	Definition	Questionnaire Items	Reference
CSE	Computer self-efficacy	the degree to which an individual is confident that s/he can perform a specific task or achieve a specific goal (Bandura, A. (1997). Self-efficacy: The exercise of control. New York: W.H. Freeman)	<p>I feel confident using e-learning systems.</p> <p>I feel confident operating e-learning functions.</p> <p>I feel confident using online learning contents.</p> <p>I feel confident uploading home works and downloading learning contents.</p>	(Liaw and Huang, 2013)
PU	Perceived usefulness	the extent to which a user believes that utilizing a certain system would influence his/her job performance and productivity positively (i.e. providing timely information)(Davis, 1989).	<p>I believe e-learning systems are useful learning tools.</p> <p>I believe using e-learning is effective for learning.</p> <p>I believe e-learning contents are informative.</p> <p>I intend to use e-learning to assist my learning in the future.</p>	(Liaw and Huang, 2013)

			<p>I intend to use e-learning content to assist my learning.</p> <p>I intend to use e-learning to improve my learning motivation</p>	
AU	Actual use	the use of system (U) as its output described in terms of current or self-reported usage(Delone and Mclean, 2003)	<p>I use LMS on daily basis.</p> <p>I use LMS frequently</p> <p>I visit LMS often</p>	(Ramírez-Correa <i>et al.</i> , 2017)
US	User satisfaction	the extent to which users believe the information system available to them meets their information requirements(Ives <i>et al.</i> , cited in Eom 2014, p. 10)	<p>Most of the users bring a positive attitude or evaluation towards the LMS function.</p> <p>I think the LMS is very helpful.</p> <p>Overall, I am satisfied with the LMS.</p>	(Ramírez-Correa <i>et al.</i> , 2017)
IQ	Information Quality	the characteristics of the output offered by the IS, such as accuracy, timeliness and completeness metrics(Delone and Mclean, 2003)	<p>The LMS provides information that is exactly what you need (Freeze <i>et al.</i>, 2010).</p> <p>The LMS provides information that is relevant to your job.</p>	(Ramírez-Correa <i>et al.</i> , 2017)

			<p>The LMS provides sufficient information.</p> <p>The LMS provides information that is easy to understand.</p> <p>The LMS provides up-to-date information.</p>	
PEOU	Perceived Ease of Use	the extent to which people believe that using certain system would be effortless(Davis, 1989)	<p>I feel that using an LMS would be easy for me.</p> <p>I feel that my interaction with LMS would be clear and understandable.</p> <p>I feel that it would be easy to become skillful by using LMS.</p> <p>I would find LMS to be flexible to interact with learning and operate LMS would be easy for me.</p> <p>It would be easy for me to get LMS to do what I want to do.</p>	(Alharbi and Drew, 2014)
SN	Subjective norm	A person's attitudes towards performing behavior in order to a social referent. These referents may be parents, teachers, friends, classmates, etc. (Taylor & Todd 1995)The degree to	<p>1.My teachers think that I should use the system.</p> <p>2.My friends think that I should use the system.</p>	(Lee, 2006)

		which a person perceives that others believe he or she should use the technology (Taylor & Todd 1995).		
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