Developing a Theoretical Framework for understanding eLearning Systems Success

Samarasinghe, S. M.,

Department of Information Technology
University of Sri Jayewardenepura, Sri Lanka
malkanthi@sjp.ac.lk

Senaratne, S. I.,

Department of Information Technology
University of Sri Jayewardenepura, Sri Lanka
sanduni@sjp.ac.lk

Abstract

Effective implementation, management, and success of e-Learning systems have drawn the attention of many researchers. However, e-Learning systems success research lacks models and frameworks addressing organisational dimensions along with lecturer and learner dimensions. Hence, the objective of this study was to explore the dimensions of e-Learning systems success to develop a broad framework to understand the e-Learning systems success dimensions. The overall success of an e-Learning system comprises a number of dimensions, all reflecting different aspects of e-Learning systems success. Based on a comprehensive review of literature, a three tier multidimensional framework of e-Learning systems success was derived. The dimensions are categorised as organisational dimensions, lecturer dimensions, and learner dimensions. The framework constitutes a source of ideas for e-Learning systems success dimensions appropriate for particular contexts. To develop a specific model, the relevant dimensions are to be adopted from the framework. The framework could be validated by formulating e-Learning systems success models that could be validated against survey data.

Key Words: e-Learning, e-Learning systems success, Learning management systems, Lecturer, Learner

1. INTRODUCTION

e-Learning refers to delivering learning by using a variety of electronic media, especially Internet technologies (Ozkan & Koseler, 2009). More broadly, e-Learning is an approach to teaching and learning, representing all or part of the educational models applied, that is based on the use of electronic media and devices as tools for improving access to training, communication and interaction and that facilitates the adoption of new ways of understanding and developing learning. (Sangrà et al., 2012). According to Rosenberg (2001, p.28), the three fundamental criteria for e-Learning are: (1) it is networked; (2) it is delivered to the end user via a computer using Internet technology; and (3) it focuses on the broadest view of learning that goes beyond the traditional paradigms of teaching and learning.

Information technology deployed at organizations, such as tertiary education providers, to enable e-Learning leads to organizational e-Learning systems—a new type of information systems. Such e-Learning systems may be based on Learning Management Systems (LMS) (Lonn &Teasley, 2009; Almrashdeh et al., 2011), such as Moodle or Blackboard.Further e-Learning capabilities may be provided by adding specialized software, such as Adobe Connect, with the full set of e-Learning tools supported by the organization forming the organisation's e-Learning system. Occasionally, innovative lecturers may provide e-Learning by using new tools that are not part of their organization's e-Learning system.

The emergence of large scale e-Learning systems is one of the most significant developments in the information systems (ISs) industry (Wang et al., 2007). Thus, the traditional context of education has encountered dramatic changes with the emergence of Internet-based teaching and learning (LeePost, 2009). According to a survey conducted by the UK Chartered Institute of Personal Development (2011), 53% of organisations have reported that they have increased their use of e-Learning in 2010, and over 90% of public organisations have reported that they were using e-Learning during that period.

The effective use of information technology (IT) in teaching and learning has been viewed as having the potential to improve the quality of learning as well as access to education and training (Gilbert et al., 2007).These technologies can be utilized to respond to the dynamic demands within the sector such as more flexible learning, expansion of university services to national and international markets and for more cost-effective delivery of higher education (Alfahad, 2012).According to Ozkan et al.(2009), e-Learning has become the new paradigm in education because of its convenience, reduction of costs, and flexibility. Further, Rosenberg (2001)identified cost effectiveness, availability anywhere and anytime, building communities, and providing valuable customer service as several benefits of e-Learning. Dailey-Hebert and Donnelli (2010) suggested that by combining service-learning and eLearning pedagogies, educators can initiate innovative pedagogical approaches that are aligned to the personal characteristics and educational preferences of the millennial learners.

Many higher education institutions are motivated to introduce innovative e-Learning programmes by expanding their educational boundaries. However, the development and implementation of successful e-Learning systems is quite challenging to higher education institutions and for business organisations because of the size of the investment required and

because of the uncertainty of the outcomes (Govindasamy, 2002).Thus, an understanding of the dimensions of e-Learning systems success is essential for the development and delivery of successful e-Learning initiatives (Lee et al., 2009) and for continuous improvement of existing systems (Ozkan & Koseler, 2009). Govindasamy (2002) also stated that measurement of e-Learning systems success is essential to develop better e-Learning initiatives and to yield a justifiable return on investment.

Large investments on e-Learning and rapid growth in the adoption of e-Learning have motivated researchers to study the success of e-Learning systems and the issues related to their implementation (Lee et al., 2009; Lee & Lee, 2008; Park, 2009). A considerable number of studies have attempted to use measures such as user satisfaction, user acceptance, learning effectiveness, and e-Learning continuance intention in assessing e-Learning systems success. However, there is no universally accepted definition for e-Learning systems success.

As e-Learning systems are ISs, e-Learning systems success can be viewed as ISs success. Saarinen (1996) reviewed different definitions of systems success in Management Information Systems literature, and found that most of the researchers defined information systems success as a favourable or satisfactory result or outcome from the perspective of different stakeholders. At the same time, he pointed out the difficulty of clearly defining what system success is because of the need to reconcile different views regarding the content and the scope of ISs success.

DeLone and McLean (1992, 2016) emphasised that ISs success is multidimensional, with different dimensions affecting each other. They suggested generic dimensions, including the quality of the processing system itself, the quality of the information provided by the system, system use by the users, user satisfaction, and the impact on individuals or organisations. They suggested that ISs success studies in specific contexts would be more meaningful if multidimensional measures are used systematically combining individual success dimensions in an appropriate manner to fit into a particular study context.

e-Learning systems have been studied by different research communities, such as Management Information Systems, Education, and Psychology, as they are multidisciplinary by nature (Byrd,2012; Kiteley & Ormrod, 2009; Nair & George, 2016 Ozkan & Koseler, 2009). However, most of the e-Learning research to date relied on a limited view of e-Learning system success, with most studies using a single success dimension (such as learner satisfaction or

learning effectiveness). There are e-Learning systems success studies (such as Aparicio et al., 2017; McGill& Renzi, 2014) that follow DeLone and McLean (2003) in representing systems success as multidimensional, with the dimensions affecting each other. These studies, however, focus on a single type of stakeholder, namely, learners.There are no frameworks or models of e-Learning systems success that would account for multiple stakeholders. Thus, the objective of this study is to identify the various facets of the concept of e-Learning systems success and to organize them as a multidimensional framework.

2. LITERATURE REVIEW

In order to achieve the above identified objective, a three tier multidimensional framework of e-Learning systems success was derived based on a review of the literature. The overall success of an e-Learning system comprises a number of dimensions, all reflecting different aspects of e-Learning systems success. The dimensions are categorised as organisational dimensions, lecturer dimensions, and learner dimensions.The review allowed proposing a multidimensional framework organising the dimensions of e-Learning systems success suggested by the literature (see Figure 2). The following subsections provide a discussion of the literature on which the framework was developed.

2.1 Organizational Dimensions

This section presents the organisational dimensions of e-Learning systems success.

2.1.1 Quality of the e-Learning development and implementation process

e-Learning development and implementation refers to the process used to develop and implement organisation-wide e-Learning. Organisations develop and implement e-Learning systems by executing organisation-wide e-Learning programmes (Howell, et al., 2004).Recent research posited the importance of the quality of the e-Learning development and implementation process for e-Learning systems success (Blackburn, 2017;Deepwell, 2007; Marshall &Mitchell, 2005).In addition, Larsen (2003) found that research in information systems maturity is limited, and suggested that the role of information systems maturity as a dimension of information systems success and expressed it as an important area for future research.

Howell, Saba, Lindsay, and Williams(2004) conducted a literature review to formulate strategies for faculty adoption of e-Learning systems. According to them, e-Learning programme evaluation, professional development for instructors, instructor involvement in the

process of e-Learning development, and assessment of instructor views for continuous improvement of the e-Learning initiatives are all important for successful faculty adoption of e-Learning systems and faculty satisfaction. Therefore, in this research, the quality of the e-Learning development and implementation process is considered as an e-Learning systems success dimension and categorised as an organisational dimension within the e-Learning system success framework (see Figure 2).

2.1.2 Quality of the institutional support to system users

Quality of the institutional support to system users refers to the quality of the support provided by the organisation to the lecturers and to the students that are using the e-Learning system. Support to lecturers may involve technical support and support with pedagogical aspects of using e-Learning (Phillips & Merisotis, 2000); support to learners may involve technical support as well as provision of generic information services, such as access to library resources online (Selim, 2007). Previous research identified institutional support to system users as an important dimension of systems success (Almpanis, 2015; Selim, 2007; Wang & Wang, 2009).Institutional support to instructors was found to be influential in instructor decisions to adopt e-Learning systems (Samarawickrema & Stacy, 2007). Wang and Wang (2009) also identified service quality as a determinant of instructor adoption of e-Learning systems.Therefore, in this study, institutional support to e-Learning system users was categorised as an organisational dimension within the e-Learning systems success framework (see Figure 2).

2.1.3 Quality of the e-Learning system

Quality of e-Learning system refers to the quality of the set of technologies (and their implementations) used for e-Learning throughout the organisation with the explicit support of the organisation. The construct of quality of the e-Learning system (defined similarly to the present study) has been highlighted by a number of authors (Abdous & Yoshimura, 2010; Hadullo & Omwenga, 2017; Mahdizadeh et al., 2008). A few e-Learning researchers examined quality of the e-Learning system from alecturer perspective (Wang et al., 2010; Wang & Wang, 2009; Yengin et al., 2011).In addition to the studies from the lecturer perspective discussed above, quality of the e-Learning system construct was extensively studied from the student perspective (Adeyinka & Mutula, 2010; Chen, 2010; Chen, 2012; Chen et al., 2009; Ozkan & Koseler, 2009; Waheed, 2016).In this study, quality of the e-Learning system is categorised as

an organisational dimension within the e-Learning systems success framework (see Figure 2) because the e-Learning system is provided to its users by the organisation.

2.2 LecturerDimensions

This section presents lecturer dimensions of e-Learning systems success.

2.2.1 Lecturer use of the e-Learning system

*Lecturer use of the e-Learning system*refers to the extent to which alecturer uses the functionalities provided by the e-Learnng system (in other words, to the usage of the e-Learning system by the lecturer). System usage is a widely applied measure of IS success. Indeed, IS success is often defined as the degree to which a system is accepted and used (Davis, 1989) and user acceptance and usage is an important measure (DeLone & McLean, 1992, 2016). Without consideration of user behaviour regarding acceptance and usage of a system, even the best systems cannot be successful. Thus, in thisstudy, system use was considered as an e-Learning systems success dimension. This dimension is categorised as a lecturer dimension within the e-Learning systems success framework (see Figure 2).

2.2.2 Lecturer satisfaction

Lecturer satisfaction refers to the extent to which the e-Learning system meets the lecturer's expectations. User satisfaction is a commonly used construct in evaluating IS success (Doll & Torkzadeh, 1988; Vaezi, 2013, 2016). The comprehensive review of early IS success literature by DeLone and McLean (1992), covering 180 journal articles, revealed that user satisfaction dimension was the most widely used measure of IS success up until that time. Similarly, lecturer satisfaction is considered an important construct in developing and implementing successful e-Learning systems (Bolliger & Wasilik, 2009; Wasilik & Bolliger, 2009; Yengin et al., 2011).Lecturer satisfaction is an influential construct in providing learners with high quality learning experiences, as shown by Wasilik and Bolliger. The review of literature highlighted the fact that user satisfaction is one of the most frequently reported success measures in e-Learning systems success research.

However, although the lecturer plays a critical role in implementing successful e-Learning systems, there is little e-Learning systems success research that is focused on evaluating lecturer(rather than learner) satisfaction. Thus, in thisstudy, lecturer satisfaction is included as

another dimension. Lecturer satisfaction is categorised as a lecturer dimension within the e-Learning systems success framework (see Figure 2).

2.2.3   Quality of the e-Learning content

Quality of the e-Learning content refers to the quality of content provided by the lecturer to learners via the e-Learning system. Quality of the e-Learning content is another dimension commonly used in studies of e-Learning systems success (Chen, 2010; Chen, et al., 2009; Ozkan et al., 2009; Vlachopoulos,2016). In previous research, e-Learning content quality was used as an independent construct affecting one or more of the dependent constructs. Similarly, quality of information produced by ISs was commonly studied in ISs contexts (DeLone & McLean, 2003; Makau et al., 2017;Wang, 2008) and found to be an antecedent to system use and user satisfaction.

This section highlights the importance of quality of the e-Learning content as a determinant of e-Learning systems success. Thus, in thisstudy, quality of the e-Learning content was considered as an e-Learning systems success dimension (see Figure 2). The quality of the e-Learning content dimension was categorised under lecturer dimensions within the e-Learning systems success framework because e-Learning content is developed by the lecturer.

2.2.4   Quality of the lecturer support to learners

Quality of the lecturer support to learners refers to the quality of support, such as responding to student queries, provided by the lecturer to learners via the e-Learning system. Another construct identified as a determinant of e-Learning systems success is quality of the lecturer support provided to learners via the e-Learning system. Several studies (Lee et al., 2018; Lee & Lee, 2008; Roddy et al., 2017) conceptualised the service quality dimension used in IS literature in the e-Learning context as the lecturer support to learners.Therefore, in thisstudy, quality of the lecturer support to learners is categorised as a lecturer dimension within the e-Learning systems success framework (see Figure 2).

2.2.5 Lecturer self-efficacy

Lecturer self-efficacy refers to the extent to which the lecturer believes that he/she has the ability to effectively use the e-Learning system to promote and to manage learning by learners. Self-efficacy is defined as individuals' judgment of their abilities to plan and carry out the necessary behaviours in order to achieve specific goals (Bandura, 1997). Self-efficacy is an important construct in determining an individual's behavioural intention and actual behaviour (Pertl, 2010).Therefore, in this study, lecturer self-efficacy was categorised as a lecturer dimension within the e-Learning systems success framework (see Figure 2).

2.3 Learner Dimensions

This section presents learner dimensions of e-Learning systems success.

2.3.1 Learner use of the e-Learning system

Learner use of the e-Learning system refers to the extent to which the learner is using the e-Learning system for learning. Researchers have conceptualised e-Learning system success via the actual or self-reported use of the e-Learning system (Raaij & Schepers, 2008). Carswell and Venkatesh (2002) identified three acceptance outcomes, namely, involvement, engagement, and use of different media. Some of the prior studies examined usage behaviour using the IS Success Model (DeLone & McLean, 2003) as a theoretical basis. These studies considered information quality, system quality, and service quality as direct antecedents of system usage. In view of the strong empirical support in prior studies, in this study,learner use of the e-Learning system was categorised as a learner dimension within the e-Learning systems success framework (see Figure 2).

2.3.2 Learner satisfaction

Learner satisfaction refers to the extent to which learning via the e-Learning system meets the learner's expectations. Learner satisfaction is widely used as a construct in e-Learning systems success research. The level of user satisfaction is related to a user's willingness to continue using new technology (Kim & Malhotra, 2005). Much of the recent research on e-Learning systems success used learner satisfaction as the dependent variable (Ferguson & DeFelice, 2010; Lee et al., 2018; Paechter et al., 2010; Palmer & Holt, 2009). The literature highlights the importance of assessing and understanding learner satisfaction in online learning environments.Taken together, these studies suggest that learner satisfaction is an important

dimension of e-Learning systems success. Therefore, in thisstudy, learner satisfaction is included as a learner dimension within the e-Learning systems success framework (see Figure 2).

2.3.3 Level of learning

Level of learning refers to the quality of learning attained by the learner. Student learning is a construct frequently used in evaluating the success of online learning environments (Ferguson &DeFelice, 2010; Rasouli et al., 2016;Sher, 2009; Wu et al., 2010; Yukselturk & Bulut, 2007). Chou & Liu (2005) defined student learning as the extent to which learning goals (target knowledge and skills) are achieved by students. e-Learning researchers typically evaluate student learning or learning effectiveness by looking at student performance.The discussion on student learning has highlighted the wide use of the student learning construct in measuring e-Learning systems success. Therefore, in thisstudy, student learning is categorised as a learner dimension within the e-Learning systems success framework(see Figure 2). Student learning is conceptualised emphasising the level of learning achieved.

2.3.4 e-Learning continuance intention

e-Learning continuance intention refers to learner intention to continue using e-Learning in the future. e-Learning continuance intention is based on the IS continuance intention introduced by Bhattacherjee (2001) in the general IS success context. The theoretical models developed to examine IS usage were mainly developed for initial acceptance and usage of systems (Ajzen, 1991; Davis, 1989). However, Bhattacherjee argued that while initial acceptance and usage has importance in terms of realising success, long term success depends on continued use rather than first time use. To date e-Learning continuance intention has underpinned number of studies in e-Learning success both in the higher education sector (Almahamid & Rub, 2011; Sorebo et al., 2009; Ismail et al., 2011) and in business organisations (Roca & Gagne, 2008). Therefore, in this study, e-Learning continuance intention is categorised as a learner dimension within the e-Learning systems success framework (see Figure 2).

2.3.5 Learner self-efficacy

Learner self-efficacy refers to the extent to which the learner believes that he/she has the ability to effectively use the e-Learning system to learn. A number of studies examined how learner

ability and confidence in using e-Learning systems affect their satisfaction and learning (Artino et al., 2010; Hagos et al., 2016;Wu et al., 2010). Learner self-efficacy is an important determinant of academic achievement in e-Learning (Artino et al., 2010; Zimmerman & Kulikowich, 2016). Also, Lin et al. (2008) found that self-efficacy is a determinant of learner satisfaction. The findings of the prior studies indicated that self-efficacy is a determinant of learner satisfaction and future intention to continue e-Learning. The above discussion highlights the significant impact of learner self-efficacy on other e-Learning systems success dimensions: learner satisfaction, student learning, and learner intention to continue e-Learning in future. Therefore, in thisstudy, learner self-efficacy is included as a learner dimension within the e-Learning systems success framework (see Figure 2).

3. E-LEARNING SYSTEMS SUCCESS FRAMWORK

The review of IS success and e-Learning systems success literature provided the theoretical foundation for the study. The broad nature of the objective of the research necessitated a wide coverage of literature to provide sufficient understanding of the dimensions of e-Learning systems success. Literature relating to both e-Learning systemssuccess and ISs success, it is evident that the success dimensions suggested or implied by the existing studies are often similar to one or more of the success dimensions identified in the IS success model by DeLone and McLean (2003), and therefore, are related to the DeLone and McLeanIS success model.

Quality of the institutional support and quality of the e-Learning system (corresponding to service quality and system quality in the IS success model) were categorized as organisational dimensions, as these dimensions are determined at organisational level. As it was found, that these dimensions do not cover all of the relevant e-Learning systems success facets at organisational level, another dimension was added reflecting quality of the e-Learning development and implementation process, for which there was support in the literature (inspired by the process maturity theory, Larsen, 2003).

Some of the dimensions of e-Learning systems success revealed in the literature (in particular, lecturer and learner self-efficacy examined in this research) can be traced to self efficacy theory (Bandura, 1997). Self efficacy theory is a widely accepted theory explaining individual behaviour. It focuses on the relationships among behaviour, cognition, and environment(Miltiadou & Savenye, 2003). Thus, the overall theoretical foundations behind the e-Learning systems success framework are depicted in the diagram in Figure 1.
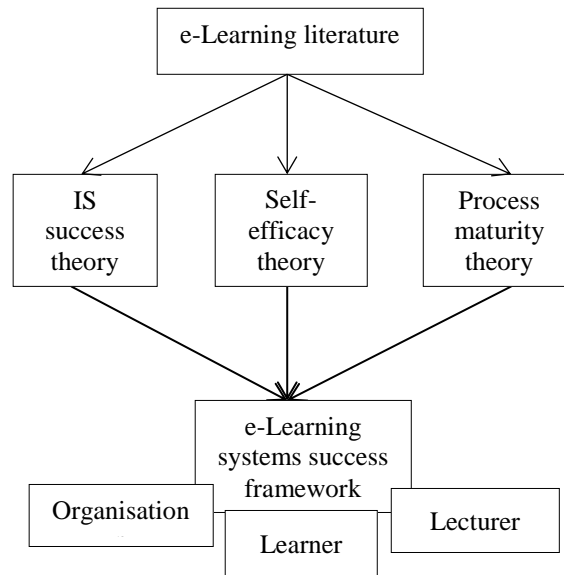
Figure 1: Theoretical foundations of the framework

The dimensions of e-Learning systems success identified in the review are summarised in the diagram in Figure 2. The areas in the diagram represent the division of e-Learning systems success dimensions into three tiers, and the arrows indicate the overall direction of the flow of causality. The diagram (see Figure 2) constitutes a framework for developing models of e-Learning systems success for use in specific contexts.
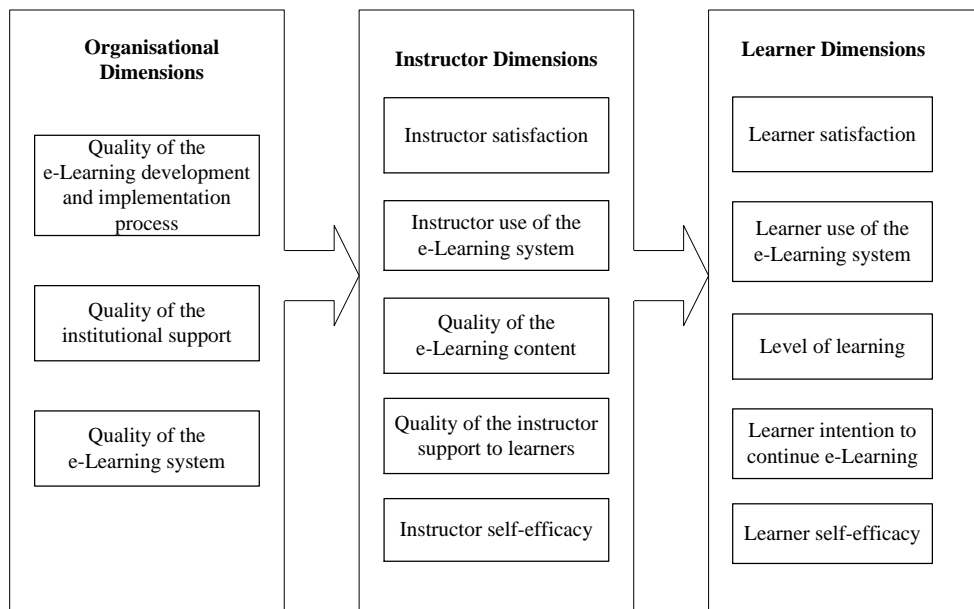

Figure 2: e-Learning systems success framework formulated based on the literature.

4. CONCLUSION

A model of e-Learning systems success is a special case of the model of IS success (Alsabawy et al., 2012; DeLone & McLean, 2003; Petter et al., 2013). It is a set of interrelated dimensions reflecting the relevant facets of e-Learning systems success from the perspective of e-Learning system stakeholders. Thus, for a dimension included in the framework to be seen as valid in a particular context, it has to be tested as a part of an e-Learning systems success model. Therefore, the framework, by summarising the literature, constitutes a source of ideas for e-Learning systems success dimensions appropriate for particular contexts. The framework can be seen as a descriptive model according to the classification of types of models relevant to management information systems research provided by Gregor (2006).To develop a specific model, the relevant dimensions are to be adopted from the framework (possibly also including context-specific dimensions not included in the framework), and specific hypotheses are to be developed, with overall direction of the hypotheses likely to coincide with the arrows in the diagram. The framework could be validated by formulating e-Learning success models that could be validated against survey data.

References

Abdous, M., and Yoshimura, M. (2010), "Learner outcomes and satisfaction: A comparison of live video-streamed instruction, satellite broadcast instruction, and face-to-face instruction", Computers & Education, Vol.55, No.2, pp. 733-741.

Adeyinka, T., and Mutula, S. (2010), "A proposed model for evaluating the success of WebCT course content management system", Computers in Human Behavior, Vol.26, No.6, pp. 1795–1805.

Ajzen, I. (1991), "The theory of planned behaviour", Organizational Behavior and Human Decision Processes, Vol.50, No.2, pp. 179-211.

Alfahad, F.N., (2012), "Effectiveness of using information technology in higher education in Saudi Arabia", Social and Behavioral Sciences, Vol.46, pp.1268 – 1278.

Almahamid,S. and Rub, F.A. (2011), "Factors that determine continuance intention to use e-learning system: an empirical investigation", International Conference on Telecommunication Technology and Applications Proc .of CSIT. Vol.5 IACSIT Press, Singapore.

Almpanis, T. (2015), "Staff Development and Institutional Support for Technology Enhanced Learning in UK Universities", The Electronic Journal of e-Learning, Vol.13, No.5, pp.366-375.

Almrashdeh, I.A., Sahari, N., Zin, N.A.M. and Alsmadi, M. (2011), "Distance learning management system requirements from student's perspective", Journal of Theoretical and Applied Information Technology, Vol.24, No.1, pp. 17-27.

Alsabawy, A.Y., Steel, A.C. and Soar, J. (2012), "A Model to Measure E-Learning Systems Success", PACIS 2011 Proceedings, Vol.15, pp.1-15.

Aparicio, M., Bacao, F. and Oliveira, T. (2017) "Grit in the path to e-learning success", Computers in Human Behavior, Vol. 66, pp. 388-399.

Artino, A. R., La Rochelle, J. S., and Durning, S. J. (2010), Second-year medical students' motivational beliefs, emotions, and achievement. Medical Education, 44, 1203–1212.

Bandura, A. (1997). Self-efficacy. New York: W. H. Freeman.

Blackburn, G. (2017), "A University's Strategic Adoption Process of an PBL-Aligned E Learning Environment: An Exploratory Case Study", *Educational Technology Research and Development*, Vol.64, No.4, pp. 1-30.

Bolliger, D. U., and Wasilik, O. (2009), "Factors influencing faculty satisfaction with online teaching and learning in higher education", Distance Education, Vol.30, No.1, pp.103-116.

Byrd, R. (2012), "Using Appropriate E-learning Systems to Optimize Teaching and Learning", GSTF Journal on Computing (JoC) Vol.2, No.3, pp. 47 – 52.

Chen, C. Y., Chang, R. E., Hung, M. C., and Lin, M. H. (2009), "Assessing the quality of a web-based learning system for nurses", Journal of Medical Systems, Vol.33, No.4, pp. 317-325.

Carswell, A. D. and Venkatesh, V. (2002), "Learner outcomes in an asynchronous distance education environment", *Int. J. Human-Computer Studies,* Vol. 56, pp. 475–494.

Chen, H. J. (2012), "Clarifying the empirical connection of new entrants' e-learning systems use to their job adaptation and their use patterns under the collective–individual training environment", Computers & Education, Vol.58, No.1, pp. 321-337.

Chen, R. J. (2010), "Investigating models for preservice teachers' use of technology to support student-centered learning" Computers & Education, Vol.55, No.1, pp. 32-42.

Dailey-Hebert, A., & Donnelli, E. (2010), "ServiceeLearning: Educating today's learners for an unscripted future", *Journal of Organizational Analysis*, Vol.18, No.2, pp.216-227.

Davis, F. (1989), "Perceived usefulness, perceived ease of use, and user acceptance of information technology", MIS Quarterly, Vol.13, No.3, pp. 319-339.

Deepwell, F. (2007), "Embedding quality in e-Learning implementation through evaluation", Educational Technology & Society, Vol.10, No.2, pp. 34-43.

DeLone, W. H., and McLean, E. R. (1992), "Information systems success: The quest for the dependent variable", Information Systems Research, Vol.3, No.1, pp. 60-95.

DeLone, W. H., and McLean, E. R. (2003), "The DeLone and McLean model of information systems success: A ten-year update", Journal of Management Information Systems, Vol.19, No.4, pp. 9-30.

DeLone, W. H. and McLean, E. R. (2016), "Information Systems Success Measurement", *Foundations and Trends in Information Systems*, Vol. 2, No. 1, pp 1-116.

Doll, W.J., Torkzadeh, G. (1988), "The measurement of end-user computing satisfaction", *MIS Quarterly,* Vol.12, No. 2, pp. 259 -274.

Ferguson, J. M., and DeFelice, A. E. (2010), "Length of online course and student satisfaction, perceived learning, and academic performance", International Review of Research in Open and Distance Learning, Vol.11, No.2, pp. 73-84.

Gilbert, J., Morton, S., and Rowley, J. (2007), "e-Learning: the student experience", British Journal of Educational Technology, Vol.38, No.4, pp. 560-573.

Govindasamy, T. (2002), "Successful implementation of e-Learning: pedagogical considerations", The Internet and Higher Education, Vol.4, No. (3–4), pp. 287–299.

Gregor, S. (2006), "The Nature of Theory in Information Systems", *MIS Quarterly*, Vol.30, No.3, pp. 611-642.

Hagos, Y., Garfield, M. and Anteneh, S. (2016), "Measurement factors model for e-learning systems success", Tenth International Conference on Research Challenges in Information Science (RCIS).

Howell, S. L., Saba, F., Lindsay, N. K., and Williams, P. B. (2004), "Seven strategies for enabling faculty success in distance education", The Internet and Higher Education, Vol.7, No.1, pp. 33–49.

Ismail, N.Z., Razak, M.R., Zakariah, Z., Alias, N. and Aziz, M.N.A. (2011), "E-Learning Continuance Intention Among Higher Learning Institution Students' in Malaysia", Social and Behavioral Sciences, Vol. 67, pp. 409 – 415.

Chou, S.W. and Liu, C.H., (2005), "Learning effectiveness in a Web-based virtual learning environment: A learner control perspective", *Journal of Computer Assisted Learning*, Vol.21, No.1, pp.65-76.

Kim, S.S. and Malhotra, N.K., (2005), "A Longitudinal Model of Continued IS Use: An Integrative View of Four Mechanisms Underlying Postadoption Phenomena", *Management Science,* Vol.51, No. 5, pp. 741 -755.

Kiteley, R. J., and Ormrod, G. (2009), "Towards a team-based, collaborative approach to embedding e-Learning within undergraduate nursing programmes", Nurse Education Today, Vol.29, No.6, pp. 623–629.

Larsen, K. R. T. (2003). "A Taxonomy of Antecedents of Information Systems Success: Variable Analysis Studies", *Journal of Management Information Systems*, Vol.20, No.2, pp.169-246.

Lee, B. C., Yoon, J. O., and Lee, I. (2009), "Learners' acceptance of e-Learning in South Korea: Theories and results", Computers & Education, Vol.53, No.4, pp. 1320-1329.

Lee, J., and Lee, W. (2008), "The relationship of e-Learner's self-regulatory efficacy and perception of e-Learning environmental quality", Computers in Human Behaviour, Vol.24, No.1, pp.32-47.

Lee, M. C. (2010), "Explaining and predicting users' continuance intention toward e-Learning: An extension of the expectation–confirmation model", Computers & Education, Vol. 54, No.2, pp. 506-516.

Lee, S.J., Lee, H. and Kim, T.T. (2018), "A Study on the Instructor Role in Dealing with Mixed Contents: How It Affects Learner Satisfaction and Retention in e-Learning", Sustainability, Vol.10, 850.

LeePost, A. (2009), "e-Learning success model: an information systems perspective", Electronic Journal of e-Learning, Vol.7, No.1, pp. 61-70.

Lin, Y.-M., Lin, G.-Y., & Laffey, J. M. (2008), "Building a Social and Motivational Framework for Understanding Satisfaction in Online Learning" *Journal of Educational Computing Research*, Vol. 38, No.1, pp. 1-27.

Lonn, S. and Teasley, S. (2009), "Saving time or innovating practice: investigating perceptions and uses of learning management systems", Computers & Education, Vol.53, No.3, pp. 686–694.

Mahdizadeh, H., Biemans, H. and Mulder, M. (2008), "Determining factors of the use of e-Learning environments by university teachers", Computers & Education, Vol.51, No.1, pp. 142-154.

Makau, S., Charles, L. and Bonuke, R. (2017), "Information Quality, Information Systems Support Capability and Performance of Hotels in Nairobi, Kenya", European Scientific Journal, Vol.13, No.23, pp.275 – 301.

Marshall, S. and Mitchell, G. (2005), E-Learning process maturity in the New Zealand Tertiary Sector. Retrieved from http://www.caudit.edu.au/educauseaustralasia/2005/PDF/C3.pdf.

McGill, T.J., Klobas, J.E. and Renzi, S. (2014), "Critical success factors for the continuation of e-learning initiatives", The Internet and Higher Education, Vol. 22.

Miltiadou, M. & Savenye, W.C. (2003),"Applying Social Cognitive Constructs of Motivation to Enhance Student Success in Online Distance Education",*AACE Journal*, Vol.11, No.1, pp. 78-95.

Nair, R. and George, B. (2016), "E-learning adoption in hospitality education: An analysis with special focus on Singapore", Journal of Tourism, Heritage & Services Marketing, Vol.1, No.2, pp. 3-10.

Ozkan, S. and Koseler, R. (2009), "Multi-dimensional students' evaluation of e-Learning systems in the higher education context: An empirical investigation", Computers & Education, Vol.53, No.4, pp.1285-1296.

Ozkan, S., Koseler, R. and Baykal, N. (2009), "Evaluating learning management systems: Adoption of hexagonal e-Learning assessment model in higher education", Transforming Government: People, Process and Policy, Vol.3, No.2, pp. 111-130.

Paechter, M., Maiera, B., and Macher, D. (2010), "Students' expectations of and experiences in e-Learning: Their relation to learning achievements and course satisfaction. Computers & Education, Vol.54, No.1, pp. 222-229.

Palmer, S. R. and Holt, D. M. (2009), "Examining student satisfaction with wholly online learning" Journal of Computer Assisted Learning, Vol.25, No.2, pp. 101–113.

Park, S. Y. (2009), "An analysis of the technology acceptance model in understanding university students' behavioral intention to use e-Learning", Educational Technology & Society, Vol.12, No.3, pp. 150–162.

Phipps, R and Merisotis, J. (2000), Quality on the line: Benchmarks for success in internet-based distance education. Washington, DC: The Institute for Higher Education Policy, Retrieved from http://www.nea.org/he/abouthe/Quality.pdf.

Raaij, E. M. and Schepers, J. J. L. (2008), "The acceptance and use of a virtual learning environment in China", Computers & Education, Vol.50, No.3, pp. 838-852.

Rasouli, A. (2016), "Students' Readiness for E-learning Application in Higher Education", Malaysian Online Journal of Educational Technology, Vol.4, No.3, pp.51 – 64.

Roca, J. and Gagne, M. (2008), "Understanding e-Learning continuance intention in the workplace: A self-determination theory perspective", Computers in Human Behavior, Vol.24, No.4, 1585.

Roddy, C., Amiet, D.L., Chung, J., Holt, C., Shaw, L., McKenzie, S., Garivaldis, F., Lodge, J.M. and Mundy, M.E. (2017), "Applying Best Practice Online Learning, Teaching, and Support to Intensive Online Environments: An Integrative Review", Front. Educ. Vol.2, No.59, pp. 1- 10.

Rogers, E. M. (1995), Diffusion of innovations (4th ed.). New York: Free Press.

Rosenberg, M. J. (2001), e-Learning: strategies for delivering knowledge in the digital age, New York: McGraw-Hill.

Saarinen, T. (1996), "An expanded instrument for evaluating information system success", Information & Management, Vol.31, No.2, pp. 103-118.

Sangra, A., Vlachopoulos, D., Cabrera, N. (2012), "Building an Inclusive Definition of E-Learning: An Approach to the Conceptual Framework", *The international Review of research in open and distributed learning,* Vol.13, No.2, pp.146 – 159.

Selim, H. M. (2007), "Critical success factors for e-Learning acceptance: Confirmatory factor models", Computers & Education, Vol.49, No.2, pp. 396-413.

Sher, A. (2009), "Assessing the relationship of student-instructor and student-student interaction to student learning and satisfaction in web-based online learning", Journal of Interactive Online Learning, Vol.8, No.2, pp.102-120.

Sorebo, O., Halvari, H., Gulli, V. F. and Kristiansen, R. (2009), "The role of self-determination theory in explaining teachers' motivation to continue to use e-Learning technology", Computers & Education, Vol.53, No.4, pp.1177-1187.

Vaezi, R. (2013), "User Satisfaction with Information Systems: A Comprehensive Model of Attribute Satisfaction" pp. 1-232.

Vaezi, R., Mills, A., Chin, W. and Zafar, H. (2016), "User Satisfaction Research in Information Systems: Historical Roots and Approaches", Communications of the Association for Information Systems, Vol.38, No.27, pp.501 – 532.

Vlachopoulos, D. (2016), "Assuring Quality in E-Learning Course Design: The Roadmap", International Review of Research in Open and Distributed Learning, Vol.17, No.6, pp. 184 – 205.

Wang, J., Solan, D. and Ghods, A. (2010), "Distance learning success – a perspective from socio-technical systems theory", Behaviour & Information Technology, Vol.29, No.3, pp. 321-329.

Wang, W. T. and Wang, C. C. (2009), "An empirical study of instructor adoption of web-based learning systems", Computers & Education, Vol.53, No.3, pp. 761-774.

Wang, Y. S. (2008), "Assessing e-commerce systems success: a specification and validation of the DeLone and McLean model of IS success", Information Systems Journal, Vol.18, No.5, pp. 529–557.

Wasilik, O., and Bolliger, D. U. (2009), "Faculty satisfaction in the online environment: An institutional study", The Internet and Higher Education, Vol.12, No. (3-4), pp.173-178.

Wu, J. H., Tennyson, R. D. and Hsia, T. L. (2010), "A study of student satisfaction in a blended e-Learning system environment", Computers & Education, Vol.55, No.1, pp.155-164.

Yengin, I., Karahoca, A. and Karahoca, D. (2011), "e-Learning success model for instructors' satisfaction in perspective of interaction and usability outcomes", Procedia Computer Science, Vol.3, pp.1393-1403.

Yukselturk, E. and Bulut, S. (2007), "Predictors for student success in an online course", Educational Technology & Society, Vol.10, No.2, pp.71-83.

Zimmerman, W. and Kulikowich, J. (2016), "Online Learning Self-Efficacy in Students with and Without Online Learning Experience", American Journal of Distance Education, Vol. 30, No. 3.