



Investigating the usage of E-learning: An Integrated model of TAM and IS Success

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Abstract: Electronic learning (e-learning) is the new form of learning which is established with Internet and its services. Instructive institutes address the new and modern learning requirements by adopting new developments in the field. In this paper author has presented the integrated hypothesized model for e-learning success among undergraduate students in the contexts of Pakistan. The integrated model is based on Technology acceptance model (TAM) and Delone and Mclean information success (D&M IS) model to examine the effect of quality features, perceived ease of use and perceived usefulness on user's intentions and satisfaction towards the usage of e-learning.

Keyword: E-learning, TAM, D&M IS success model, Pakistan,

1. INTRODUCTION

There are number of definition of E-learning which are available all over the literature. "In general, E-learning can be considered as the process of learning formed by communication with contents delivered digitally with electronic services and support. It includes extensive use of information and communication-related technologies to assist, enable, and reform the process of learning. E-learning can theoretically incorporate all the other types of learning" (Thakkar, *et al.*, 2017). The E-learning is the application of Internet and related technologies to deliver the various best resolutions that can be used to improve the knowledge and learning (Wentling *et al.*, 2000). E-learning is the innovative and dynamic environment provided to the students through the practice of the Internet. Practising and implementing e-learning supports to enhance the learning quality through providing access to different services including remote learning and teamwork (Dominici and Palumbo, 2013).

E-learning has brought various changes to the higher schooling systems and replaced the learning system. E-learning is considered as the precedence of distance learning which was come into existence in the 1980's (Dorobat (Scorta), 2014). In this paper, the integrated model of e-learning usage is presented with the hypothesis statements. The dependent variable in this study is e-learning usage, whereas, mediating effect is measured by e-learning satisfaction and intention to use. In addition, three independent constructs were adapted from the study of IS success model i.e. learning quality, service quality and technical system quality

whereas two independent constructs were adopted from TAM 1989.

2. BACKGROUND

Delone and Mclean introduced the first IS success model in 1992 to measure the success of any new system, the (DeLone and McLean, 1992). Later, this model was modified and redefined by the same authors in 2003 with the addition and modification of new elements, which included "system quality", "service quality", "information quality", "use/intention to use", "user satisfaction" and "net benefits". Various researchers have regarded this model as robust and well-established, also various researcher have used this model in many fields within different contexts (Bai, Law, and Wen, 2008; Carvajal-trujillo and Bons, 2015; Gelderman, 1998; Maditinos and Theodoridis, 2010; Pikkarainen, 2010; Tam and Oliveira, 2016). The D and M IS model is best framework available for assessment of new system such as of e-learning usage. Since it is already used by various academicians to measure the e-learning application and its results on the learning style within various countries (Bhuasiri *et al.*, 2012; Freeze *et al.*, 2010; Holsapple and Lee-Post, 2006; Wang *et al.*, 2007). TAM is also a well-established and extensively used model for assessment of technology acceptance (Davis *et al.*, 1989). TAM is extensively used by various researchers in various fields (Davis and Venkatesh, 1996; Model and Straub, 2016; Vekantes *et al.*, 2009; Venkatesh, 2000; Venkatesh and Davis, 2016). Due to its popularity, various researchers have measured e-learning usage by using TAM as their baseline model (Bhuasiri *et al.*, 2012; Masrom, 2007;

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Lee, 2010; Lee, 2006; Liu *et al.*, 2009; Ong *et al.*, 2004; Pata, 2009).

The population of Pakistan is 2018 million that ranks it 6th largest populated country in the world (Worldpopulationreview, 2018). The most common method of teaching and learning in Pakistan is the class-based system, in which teacher and students need to be physically available. The traditional system of Pakistan is rapidly changing with the advancement of the Internet. In many universities, the teachers are using the web-based learning or e-learning in order to share the information regarding the syllabus, assignments and other learning activities. Government is spending on the adoption of new technologies in various fields. There are many universities, which are using the different aspects of e-learning like ERP and LMS. Thus, this study aims to measure the usage of e-learning in Pakistan by integrating two well-known IS models i.e. TAM and DandM IS success model.

3. **PROPOSED MODEL AND HYPOTHESIS**

In this section, we will discuss the proposed model along with the hypothesis as shown in the (Fig. 1)

- **Learning quality (LQ)**

Learning quality refers to “the extent to which an IS system managed to provide a conducive learning environment for learners in terms of collaborative learning” (Hassanzadeh *et al.*, 2012; Mohamed, 2012). The Hassanzadeh *et al.* originally develop this new construct in 2012. It is a new addition towards the DandM IS model. Later on, adopted by the various researchers, they confirmed and supported the argument in their study that the it has a optimistic impression on e-learning satisfaction later same argument was confirmed by (Mohammadi, 2015). In addition, if learning quality increase, the intention to use e-learning also increase (Mohammadi, 2015). Therefore, it is hypothesized as:

H1. “Learning quality has a positive attitude towards e-learning satisfaction”.

H2. “Learning quality has a positive attitude towards intention to use e-learning”.

- **Service Quality**

The concept of service quality defines “the performance of an IS itself” (Wang and Wang, 2009). Petter *et al.*, (2008) stated that it refers to “the quality of the support that system users receive from the IS department and IT support Personnel”. this construct is

used by various e-learning studies (Dorobat (Scorta), 2014; Kisanjara *et al.*, 2017; Lee, 2006; Petter *et al.*, 2008). it has positive influence on the e-learning satisfaction (Mohammadi, 2015; Poulova and Simonova, 2014; Xu *et al.*, 2014). In addition, it has service quality increase it also increase the intention to use e-learning (Chiu and Wang, 2008; Hassanzadeh *et al.*, 2012; Mohammadi, 2015). The hypothesis for service quality in this study is stated by following statements.

H3. “Service quality has a positive attitude towards e-learning satisfaction”.

H4. “Service quality has a positive attitude towards intention to use e-learning”.

- **Technical system quality (TSQ).**

Technical system quality also known as system quality which is originally described by (DeLone and McLean, 2003), as the support provided by the system to its user in order to produce information. In many studies technical system quality have positive attitude towards the satisfaction in the context of e-learning (Alsabawy, Cater-Steel, and Soar, 2012; Hassanzadeh *et al.*, 2012; Mohammadi, 2015; Saba, 2012), system quality also have positive attitude towards the intention to use in e-learning context (Chiu and Wang, 2008; Li *et al.*, 2012; Mohammadi, 2015). The hypothesis for the technical system quality in this study is stated by following statements.

H5. “TSQ has a positive attitude towards e-learning satisfaction”.

H6. “TSQ has a positive attitude towards intention to use e-learning”.

- **Perceived ease of use (PEOU).**

(Davis *et al.*, 1989) stated the PEOU as “the degree to which a person believes that using a particular system would be free of effort”. PEOU refers to how easily a user can use the new system. It is an impending receipt motivator of new high-tech applications (Venkatesh and Davis, 2016). Therefore, if PEOU increase it also increase the PU, in addition PEOU has a optimistic attitude towards PU, also it has substantial effect on intention to use e-learning (Davis *et al.*, 1989; Mohammadi, 2015). Various studies show the positive impact of PEOU on e-learning and intention to use e-learning (Chang and Chen, 2009; Li *et al.*, 2012; Liu *et al.*, 2009; Mohammadi, 2015). The hypothesis for PEOU in this research is stated by following statements.

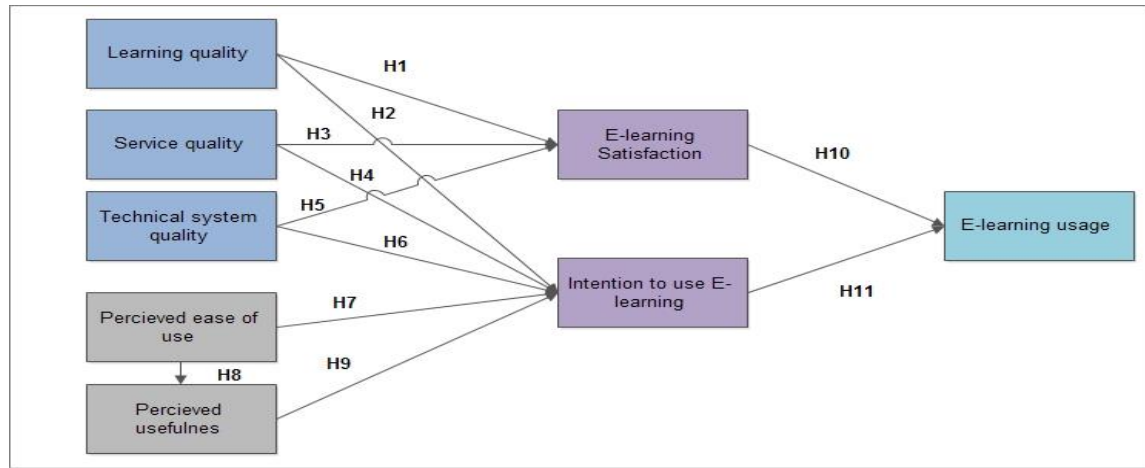


Fig 1. Proposed E-learning usage Model

H7. “PEOU has a positive attitude towards intention to use e-learning”.

H8. “PEOU has a positive attitude towards PU”.

- **Perceived usefulness (PU).**

PU is stated as “First, people tend to use or not use an application to the extent they believe it will help them perform their job better” (Davis, 1989). PU has a positive attitude towards the Intention to use the new system (Mohammadi, 2015; Pikkarainen et al., 2004; Venkatesh and Davis, 2016), this shows that more the PU there will be more e-learning intention by the users. The hypothesis for PU in this research is stated by following statements.

H9. “PU has a positive attitude towards intention to use e-learning”.

- **E-learning satisfaction.**

Satisfaction refers to “the real aim of every corporate is not to supply, not to sell, or not to serve, but rather to satisfy the needs that drive satisfaction.” (Dominici and Palumbo, 2013). It is the responsibility of every technology to provide the satisfaction towards the users of that system. It can also be defined as “the overall comments of IS users on an IS” (Wang and Wang, 2009). In various studies it was proved that e-learning satisfaction has a direct optimistic impact towards the e-learning usage (Hassanzadeh et al., 2012; Mohammadi, 2015), that shows that satisfaction increases it will increase the usage on e-learning system. The following statements state the hypothesis for satisfaction in this study.

H10. “E-learning satisfaction has a positive attitude towards the e-learning usage”.

- **Intention to use e-learning**

This construct can be defined as “Perceived behaviour of system use/actual behaviour of system

use”. In short, it defines user’s willingness for usage of new system. Key drive for many studies based on TAM have used the intention for adoption and usage of new system (Davis et al., 1989). It is used in various e-learning past studies (Hassanzadeh et al., 2012; Mohammadi, 2015; Venkatesh and Davis, 2016; Wang and Wang, 2009). These studies have verified that the increase in intention will eventually increases the system usage. Thus, it is hypothesized that:

H11. Intention to use e-learning has a positive attitude towards the e-learning-usage

4. METHODOLOGY

The quantitate survey questionnaire was developed by adopting the items from the various previous studies. The pilot study was conducted to check the reliability and consistency of items (Julie, 2011). Table 1 shows the results of cronbach’s alpha calculated through SPSS 23.0 to check the reliability of the all constructs, whereas Table 2 shows the cronbach’s alpha value construct wise. It was observed that the reliability of all the constructs was above the 0.7, which is threshold value for the validity of reliability suggested by various researchers (Ali, Samsuri, Seman, Brohi, and Shah, 2018; Brohi, Ali, Shah, Aziz, and Tamrin, 2018; Cronbach, 1951; Peter, 1981)

Table 1 Overall reliability

Case Processing Summary		
	N	%
Valid	42	100
Excluded	0	0
Total	42	100
Reliability Statistics		
Cronbach’s Alpha	N of Items	
0.735	48	

Table 2 Construct wise reliability

Construct	No.Of Items	Cronbach's Alpha	Reliability Result
Learning quality (LQ)	6	0.763	Good
Service Quality	6	0.871	Excellent
Technical system quality (TSQ).	6	0.923	Excellent
Perceived ease of use (PEOU).	6	0.821	Good
Perceived usefulness (PU).	6	0.878	Good
E-learning satisfaction.	6	0.935	Excellent
Intention to use e-learning	6	0.781	Good

4. **CONCLUSION**

In this paper the authors discussed a model for e-learning usage grounded on the MandD IS Success model and TAM. Pilot study was conducted to check the reliability and consistency of the constructs' items. In future work, a quantitative survey-based approach will be used to collect the data from four Universities in Karachi city i.e IBA, Iqra University, Indus University and Karachi University. The SPSS 24.0 version will be used for initial data analysis whereas AMOS 24.0 version will be used for data analyse and model validation.

REFERENCES:

Alsabawy, A. Y., A. Cater-Steel and J. Soar, (2012). A Model to Measure E-Learning Systems Success. Measuring Organizational Information Systems Success, 293–317.

Chang, T. Y., and Y. T. Chen, (2009). Cooperative learning in E-learning: A peer assessment of student-centered using consistent fuzzy preference. Expert Systems with Applications, 36(4), 8342–8349.

Chiu, C. M., and E.T.G. Wang, (2008). Understanding Web-based learning continuance intention: The role of subjective task value. Information and Management, 45(3), 194–201.

Ali, N. I., S. Samsuri, M. S.A. Seman, I.A. Brohi, and A. Shah, (2018). Preliminary study for online shopping satisfaction from security perspective. *International Journal of Engineering and Technology (UAE)*, 7(2).

Bai, B., R. Law, and I. Wen, (2008). The impact of website quality on satisfaction and purchase intentions:

Evidence from Chinese online visitors. *International Journal of Hospitality Management*, 27(3), 391–402.

Bhuasiri, W., Q. Xaymoungkhoun, H. Zo, J.J., Rho, and A.P. Ciganek, (2012). Critical success factors for e-learning in developing countries: A comparative analysis between ICT experts and faculty. *Computers and Education*, 58(2), 843–855.

Brohi, I. A., N. Ali, A. Shah, M.B.S., Aziz, and M.I.B.M.Tamrin, (2018). Near field communication enabled mobile payments: Preliminary study. *International Journal of Engineering and Technology (UAE)*, 7(2).

Carvajal-trujillo, E., and E. Bons, (2015). Influence of trust and perceived value on the intention to purchase travel online: Integrating the effects of assurance on trust antecedents, 47, 286–302.

Cronbach, L. J. (1951). Coefficient alpha and the internal structure of tests. *Psychometrika*, 16(3), 297–334.

Davis, F. D., R.P. Bagozzi, and P.R. Warshaw, (1989). User acceptance of computer technology: a comparison of two theoretical models. *Management Science*.

Davis, F. D., and V. Venkatesh, (1996). A critical assessment of potential measurement biases in the technology acceptance model: Three experiments. *International Journal of Human-Computer Studies*, 45(1), 19–45.

DeLone, W. H., and E. R. McLean, (1992). Information systems success: The quest for the dependent variable. *Information Systems Research*, 3(1), 60–95.

DOROBAT (SCORTA), I. (2014). Models for Measuring E-Learning Success in Universities: A Literature Review. *Informatica Economica*, 18(3/2014), 77–90.

Freeze, R. D., K.A. Alshare, P.L., Lane, and H. J. Wen, (2010). Is success model in e-learning context based on students' perceptions. *Journal of Information Systems Education*, 21(2), 173.

Gelderman, M. (1998). The relation between user satisfaction, usage of information systems and performance. *Information and Management*, 34(1), 11–18.

Hassanzadeh, A., F. Kanaani, and S. Elahi, (2012). A model for measuring e-learning systems success in Universities. *Expert Systems with Applications*, 39(12), 10959–10966.

- Holsapple, C. W., and A. Lee-Post, (2006). Defining, Assessing, and Promoting E-Learning Success: An Information Systems Perspective*. *Decision Sciences Journal of Innovative Education*, 4(1), 67–85.
- Julie, P. (2011). *Survival Manual. Training*.
- Lee, M. C. (2010). Explaining and predicting users' continuance intention toward e-learning: An extension of the expectation-confirmation model. *Computers and Education*, 54(2), 506–516.
- Lee, Y. (2006). An empirical investigation into factors influencing the adoption of an e-learning system. *Online Information Review*, 30(5), 517–541.
- Liu, S. H., H.L. Liao, and J.A. Pratt, (2009). Impact of media richness and flow on e-learning technology acceptance. *Computers and Education*, 52(3), 599–607. <http://doi.org/10.1016/j.Compedu.2008.11.002>
- Maditinos, D. I. and K. Theodoridis, (2010). Satisfaction determinants in the Greek online shopping context. *Information Technology and People*, 23(4), 312–329.
- Masrom, M. (2007). Technology acceptance model and E-learning. *12th International Conference* 21–24.
- Model, A., and D. W. Straub, (2016). Gender Differences in the Perception and Use of E-Mail: An Extension to the Technology Acceptance Model1, 21(4), 389–400.
- Mohamed, D. (2012). Investigating Cybercrimes Under the Malaysian Cyberlaws and the Criminal Procedure Code: Issues and Challengers. *Malaysan Law Journal Articles*, 6, 1–10.
- Ong, C. S., J. Y. Lai, and Y. S. Wang, (2004). Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies. *Information and Management*, 41(6), 795–804.
- Pata, K. (2009). *Modeling spaces for self-directed learning at university courses*. *Educational Technology and Society* Vol. 12.
- Peter, J. P. (1981). Validity: A Review of Basic Issues and Marketing Practices. *Journal of Marketing Research*, 18(2), 133–145.
- Pikkarainen, K. (2010). Consumer acceptance of online banking: an extension of the technology acceptance model Tero Pikkarainen.
- Tam, C., and T. Oliveira, (2016). Understanding the impact of m-banking on individual performance: DeLone and McLean and TTF perspective. *Computers in Human Behavior*, 61, 233–244.
- Vekantes, V, M. Morris, G. Davis G. D.F. Davis, (2009). TECHNOLOGY ACCEPTANCE MODEL - Research Front Map - Science. 2 of 7, 1–7.
- Venkatesh, V. (2000). Determinants of Perceived Ease of Use: Integrating Control, Intrinsic Motivation, and Emotion into the Technology Acceptance Model. *Information System Research*, 11(4), 342–365.
- Venkatesh, V., and F.D. Davis, (2016). Studies Linked references are available on JSTOR for this article: A Theoretical Extension of the Technology Acceptance Model: Four Longitudinal Field Studies, 46(2), 186–204.
- Wang, Y. S., H.Y. Wang, and D.Y. Shee, (2007). Measuring e-learning systems success in an organizational context: Scale development and validation. *Computers in Human Behavior*, 23(4),
- Worldpopulationreview. (2018). Population of Pakistan. Retrieved from <http://worldpopulationreview.com/countries/pakistan-population>