Antecedences to continued intentions of Blended Learning adoption: A framework based on information system success and technology acceptance model

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ABSTRACT

Higher education institutions have been challenged by major changes in their environments and new trends in technology-supported teaching, and new approaches in designing their curriculum. Today's students grow up with new technologies and their behaviors differ from those of previous generations. Higher education institutions are facing new challenges in recognizing the needs and development of educational offerings, which are appropriate for learning patterns, characteristics, and behaviors.

In this paper, we propose a model for measuring success of blended learning systems in higher education institutions. For this purpose, based on literature review, a conceptual model was designed and examined by students at College of Petroleum and Engineering of Kuwait University.

Keywords: Blended Learning success model; Blended Learning; LMS; Learning Management Systems; Information System Diffusion and adoption, Measuring blended learning success factors

INTRODUCTION

The concept of blended learning is receiving increasing attention among education scholars (Bonk and Graham 2012, Garrison and Vaughan 2008, Brown et al. 2007). Researchers have used different

terminology for Blended Learning and it is indeed a challenge to agree on a widely accepted definition for blended learning (Bliuc et al. 2011, Jonas and Burns 2010, Marsh and Pountney 2009, Sharpe, Benfield, and Francis 2006, Stacey and Gerbic 2007). However, there is a wide agreement on the general concept of a blended course. A blended course integrates traditional face-to-face class with online learning in a pedagogically valuable combination, which is usually means between 20 and 79% of course content and activities are delivered online (Garrison and Kanuka 2004).

Majority of researchers agree on the fact, thank blended learning is a combination of face to face and distributive learning; which is an instructional model that allows lecturers, students, and content to be in different locations and one the main features is that the learning and teaching environment is designed to accommodate the needs of students. The design of the pedagogical model should encourage students to interact with a collaborative environment. It should be mentioned that a remarkable advantage of such environments is that students can learn at their own pace (Graham 2006, Saltzberg and Polyson 1995).

The design of blended learning is very time-intensive and the content of traditional face-to-face courses should be precisely redesigned(Babb, Stewart, and Johnson 2010, Stone and Perumean-Chaney 2011, Gilbert and Flores-Zambada 2011, Toth, Amrein-Beardsley, and Foulger 2010).

Several studies indicate that using blended learning has improved learning outcomes for students (Boyle and Cook 2003, Dziuban et al. , Garnham and Kaleta 2002, Lim and Morris 2009, O'Toole and Absalom 2003, Twigg 2003). It should be also mentioned that Blended learning also promotes student satisfaction and students are enabled to be more involved in the learning process (Donnelly 2009, Sharpe, Benfield, and Francis 2006, Wang et al. 2009, Woltering et al. 2009). On the other hand, both students and institutions encounter challenges due to technology issues Vaughan (Garrison and Vaughan 2008)- Other researchers found out, that lack of pedagogical issues, such as support for course design is a challenge for meeting the learning objectives (Dziuban et al. 2006).

Also, acquiring new technology learning skills is a challenge for higher education institutions implementing blended learning (Dziuban, Hartman, and Moskal 2004). Findings of numerous research projects indicates that online elements have been positively associated with learning outcomes (Clouse and Evans 2003, Balotsky and Christensen 2004, Arbaugh and Hwang 2006, Webb, Brigman, and Campbell 2005).

Given the fact that little is known about students' perceptions in a blended learning setting, especially in the context of higher education; we see an emerging need for research in this field.

LITERATURE REVIEW

In this part, we review the literature of research methodologies, applied for measuring the success and acceptance of information system with focus on Blended Learning.

Blended Learning Systems are in the category of information systems and the success measurement could be measured with similar models, designed for measuring the success of information systems (McGill and Klobas 2009). A well know model is DeLone and McLean model (DeLone and McLean 1992), and the original model consists of six constructs: system quality, information quality, system use, user satisfaction, individual impact, and organizational impact. DeLone and McLean (DeLone and McLean 2002) extended their model in 2003 (Delone and McLean 2003), and Service Quality was added as a new construct to measure the quality of services and two constructs: Individual Impact and Organizational Impact were merged to Net Benefits.

It should be highlighted that DeLone and McLean (Delone and McLean 2003) argued that their model is not a generic model for measuring IS success and suggest that researchers need to modify the number of constructs based on their scope of their study. Many researchers have applied this, and modified the DeLone and McLean model (Hassanzadeh, Kanaani, and Elahi 2012, Holsapple and Lee-Post 2006, Ozkan and Koseler 2009). Holsapple et al. (Holsapple and Lee-Post 2006) proposed a three stage approach, the design stage, which covers service quality, system quality, and information quality, and the delivery stage consists of system use, and user satisfaction and the net benefits construct was integrated into outcome stage. Wang et al. (Wang et al. 2009) offer a model for evaluation based on the socio-technical system theory evaluating distance learning from the instructor's perspective where distance learning can be viewed as a socio-technical system. Previous studies based on DeLone and McLean's model argue the need for a systematic approach for e-Learning modeling. Ozkan et al. (Ozkan and Koseler 2009) used two categories: technical and social factors. The model uses two constructs in the DeLone and McLean model: system quality and service quality are retained and four new constructs: content quality, learner perspective, instructor attitudes and supporting issues are added.

Another model, which is measuring user acceptance and widely accepted by researchers and reactionaries is Technology Acceptance Model (TAM). TAM has been widely used as the theoretical basis for many user technology acceptances in several empirical studies to understand users' acceptance of information systems (Taylor and Todd 1995) (Venkatesh and Davis 2000). Researchers have also focused on acceptance by students in higher education institutions (Pituch and Lee 2006), and predicting end-users' acceptance of an e-learning system in organizations (Arbaugh and Hwang 2006, Williams 2008). TAM and DeLone and McLean (Delone and McLean 2003) model are similar in some constructs and could be seen as complementary. The integration of these two theories could

provide a strong model (Wang et al. 2009, Churchill 1979) and past studies integrated the two theories could provide some valid results (O'Toole and Absalom 2003, Urbach and Müller 2011).

RESEARCH MODEL

Following the discussion of each of the aspects that can influence the perception of students towards blended learning and usage of technology (DeLone and McLean 1992, Delone and McLean 2003, Ozkan and Koseler 2009, Sharpe, Benfield, and Francis 2006, Taylor and Todd 1995, Dziuban et al. 2006

), we proposed a research model as depicted in Figure 1.

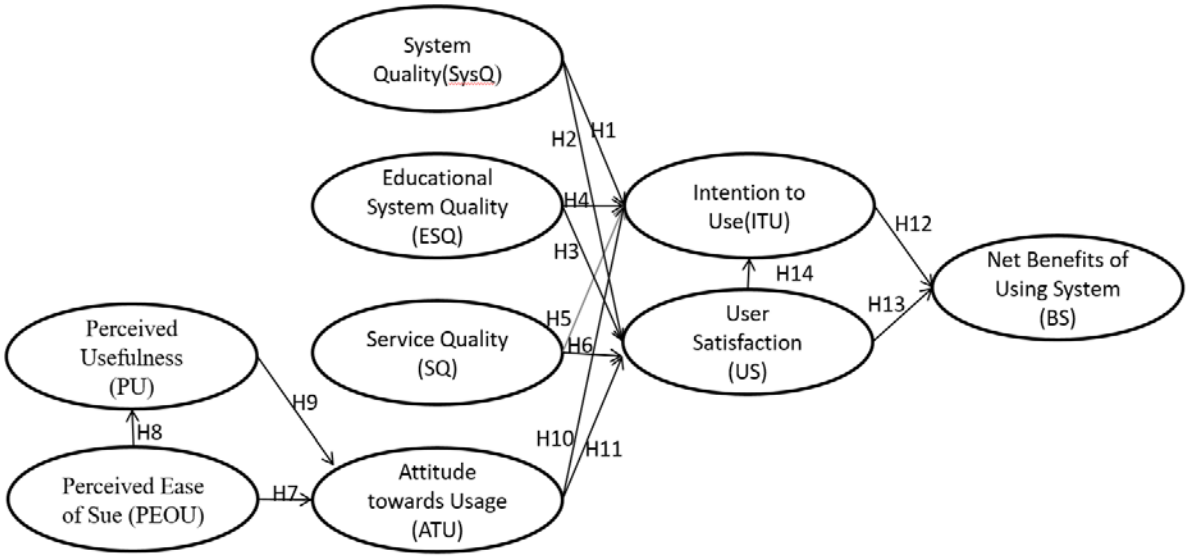

Figure 1: Proposed Blended Learning Acceptance Model

The proposed model has 9 constructs described as an oval in Figure 1 as follows: System Quality (SysQ), Educational System Quality (ESQ), Service Quality (SQ), Perceived Usefulness (PU), Perceived Ease of Use (PEOU), Attitude towards usage (ATU), Intention to Use (ITU), User Satisfaction (US) and Net Benefit of Using the System (BS). Constructs are connected using arrows in Figure 1, each arrow represent a hypothesis implication. A total of 14 Hypotheses have been formulated and in the following, each construct is described.

System Quality (SysQ): Evaluates the quality of student-instructor interaction through the LMS and can use metrics such as promptness, availability, helpfulness, and responsiveness. We formulate the following hypotheses:

H1: System quality has a positive effect on user satisfaction.

H2: System quality has a positive effect on intention to use of LMS.

Educational System Quality(ESQ): Evaluates the quality of the educational system through web environment via LMS and can use metrics such as availability, flexibility, adaptability, security, privacy, usability, response time, reliability and educational related matters such as viewing grades peer interaction. We formulate the following hypotheses:

H3: Educational system quality is positively associated with user satisfaction with LMS.

H4: Educational system quality is positively associated with the intention to use LMS.

Service Quality (SQ): Is a measure of how well the service is delivered to students and matches their expectation and related to the quality of LMS in terms of web-based student support and not related to quality of interaction with lecturers and purely related to online system. It is the perception of service performance and less expectation of service.

H5: System quality is positively associated with intention to use LMS.

H6: System quality is positively associated with User Satisfaction with LMS.

Perceived Ease of Use (PEOU): This constructs incorporates ease of use of the learning management system (LMS), clarity of its functions, ease to learn it and to have work done, and smooth transactions. We formulate the following hypothesis:

H7: Perceived ease of use has a significantly positive and direct effect on Attitude towards usage of LMS.

H8: Perceived ease of use has positive and direct effect on Perceived usefulness.

Perceived Usefulness (PU): The degree to which a person believes that using the LMS would enhance his or her performance. We formulate the following hypothesis:

H9: Perceived usefulness has a positive effect on attitude towards usage of LMS.

Attitude towards Use (ATU): Learner perspective, attitudes and supporting issues are added. We formulate the following hypotheses:

H10: Attitude towards use of LMS has a positive effect on intention to use LMS.

H11: Attitude towards use of LMS has a positive effect on user satisfaction.

Intention To Use (ITU): This is the actual use of the system or its outputs that is related to user's attitude, system use relates to users' behavior. We formulate the following hypothesis:

H12: Intention to use will positively affect net benefit

User Satisfaction (US): How LMS services and content meets learners' expectation. User satisfaction is users' general idea about system and it is often used to measure learner's attitude. This component, evaluates interaction between user and the system and is recognized as one of the main pillars of online education quality. We formulate the following hypothesis:

H13: User satisfaction has a positive effect on benefits of using the system.

H14: User satisfaction has a positive effect on intention to use

Net Benefit of using system (NB): Benefit of using blended learning system is the impact of the system on a person, group or organization. Benefits of using a system transfer will be transferred from a person to the whole organization, which means on a long-term perspective, it will add value to organizations.

In the table 1, the constructs and literature review supporting the development of the conceptual model are summarized.

Table 1

CONSTRUCTS AND SUPPORTING LITERATURE

Construct	Items
System quality (SysQ)	DeLone and McLean (Delone and McLean 2003); Wang & Wang, (Wang et al. 2009)
Service quality (SQ)	Wu, Lin and Cheng; Jiang, Klein and Carr (Jiang, Klein, and Carr 2002)
Educational System quality (ESQ)	Petter & McLean (Petter and McLean 2009); Wang & Wang, (Wang et al. 2009)
Perceived Ease of Use (PEU)	Davis (Davis 1989)
Perceived Usefulness (PU)	Davis (Davis 1989)
Attitude towards Usage (ATU)	Davis (Davis 1989)
Benefit of using system (NB)	DeLone and McLean (Delone and McLean 2003); Wang & Wang (Wang et al. 2009)
Intention to Use (ITU)	Petter & McLean, 2009; (DeLone & McLean, 2003).
User Satisfaction (US)	Wang & Wang (Wang et al. 2009), Wu, Tennyson, & Hsia (Wu, Tennyson, and Hsia 2010), Rabaa'I (Rabaa'i and Gable 2009), Bolliger, Supanakorn, & Boggs,(Bolliger, Supanakorn, and Boggs 2010).

Construct Operationalization

To test the hypotheses a self-administrated questionnaire was developed. The questionnaire used in this study is presented in appendix A. Following the recommendations of Churchill (Churchill Jr 1979) on scale development, an initial pool of 79 items was identified and items with highly similar in meaning, were removed. A total of 43 items remained. Table 2 depicts items of individual constructs with related questions. The questionnaire was based on a 5 likert scale and, the questionnaire was pilot-tested by convenient sampling and content validity was established by a pilot testing of the instrument. Even though English dominates current scientific activities, however, non-native speakers might be challenged or even misunderstand some questions. The most common reason for translation of surveys is to avoid biased responses (Van de Vijver and Leung 1997). After finalizing the translation, the survey was sent to 25 students and tests have been conducted and modifications applied.

Table 2

SUMMARY OF ITEMS OF INDIVIDUAL CONSTRUCTS WITH RELATED QUESTIONS.

Construct	Number of questions	Item number and question
Service Quality (SQ)	6	1. SQ1: The system admin is always willing to help through the system. 2. SQ2: The system admin has knowledge and background to answer your questions on the system. 3. SQ3: The system admin understands my specific needs related to the OCS service. 4. SQ4: OCS is always available for use during and outside class hours. 5. SQ5: OCS is stable. 6. SQ6: The response time of OCS is acceptable.
System Quality (SysQ)	4	7. SysQ1: I can access the OCS on any devise from anywhere without any problem. 8. SysQ2: The OCS allows me to know my current status in the course by viewing my grades online. 9. SysQ3: The OCS allows interactions with other peer students in class through participation in forums.

		10. SysQ4: The OCS keeps me updated by latest announcements related to the class.
Educational System Quality (ESQ)	7	11. ESQ1: The OCS prohibits using easy or short passwords. 12. ESQ2: The OCS maintains my privacy by not allowing other students to access or see my profile. 13. ESQ3: The content representation of the course provided by OCS is logical. 14. ESQ4: The course materials set on the OCS is consistent. 15. ESQ5: The course materials set on the OCS is updated frequently. 16. ESQ6: The course materials set on the OCS is clearly written. 17. ESQ7: The course materials set on the OCS is relevent to the course.
Perceived Ease of Use (PEOU)	6	18. PEOU1: I feel that using an OCS would be easy for me. 19. PEOU2: I feel that the OCS is easy to learn. 20. PEOU3: I feel I can easily be a skillful user of the OCS. 21. PEOU4: I feel I will find the OCS flexible for my use. 22. PEOU5: It would be easy for me to complete my course related work using the OCS. 23. PEOU6: I feel that using the OCS makes printing and submitting HWs a smooth process.
Perceived Usefulness (PU)	6	24. PU1: Using OCS will allow me to accomplish my work faster. 25. PU2: Using OCS would improve my learning performance. 26. PU3: Using OCS would increase my productivity. 27. PU4: Using OCS would enhance my effectiveness. 28. PU5: Using OCS would make it easier to do my job. 29. PU6: I would find the OCS useful.
Attitude towards usage (ATU)	3	30. ATU1: I have a generally favorable attitude toward using OCS. 31. ATU2: I believe it is a good idea to use this system for learning the course. 32. ATU3: Using this system is a waste of time.
Net benefit of using the system	4	33. BS1: Using the OCS makes me more connected to the course as well as to the instructor. 34. BS2: Using the OCS makes me ready for life-long learning.

(BS)		35. BS3: Course related information and announcements are shared and distributed with less time and less effort. 36. BS4: Using the OCS saves the environment by printing and distributing fewer papers.
Intention to use (ITU)	3	37. ITU1: I use OCS to keep in touch with course updates. 38. ITU2: I use OCS to download notes and solve HWs. 39. ITU3: I use OCS because instructor only provides course materials via the OCS.
User satisfaction (US)	4	40. US1: I am satisfied that OCS meets my educational needs. 41. US2: I am satisfied with OCS efficiency. 42. US3: I am satisfied with OCS effectiveness. 43. US4: Overall, I am satisfied with OCS.

Sample plan and data collection

The targeted sample for the study was taken from 10 randomly selected classes at College of Petroleum and Engineering of Kuwait University who were exposed to using blended learning. The blended learning service examined in this study is a Web-based learning system based on Moodle called Online Course System (OCS), with both synchronous and asynchronous services. Students, who took at least one course offered by the blended-learning service were asked to participate in this survey and a total of 273 valid responses were received. The survey was designed to only accept complete answers by having all questions tagged as mandatory.

Structural Equation Modeling (SEM)

There are two different SEM approaches: maximum likelihood approach and partial least squares (PLS) approach (Gefen, Straub, and Boudreau 2000). The maximum likelihood approach is applied for theory testing and development, whereas the PLS approach is applied for predictive application. The choice between maximum likelihood approach and PLS depends on the research model (Anderson and Gerbing 1988). The maximum likelihood approach is usually used to examine the fit between the observed and the hypothesized covariance models, and the PLS approach is used to examine variances and the significance of relationships, which makes it appropriate for making predictions (Gefen, Straub, and Boudreau 2000). As this paper evaluated the significance of relationships among the constructs, the PLS approach was applied.

There are two models in PLS analysis: *measurement model* and *structural model*. The measurement model (also known as the outer model) depicts the latent constructs and their items, and the structural model (also known as the inner model) specifies the relationships between the exogenous and endogenous latent constructs (Gefen, Straub, and Boudreau 2000, Haenlein and Kaplan 2004). In this paper, we applied the structural model.

Reflective measurement model.

To assess the reflective measurement model, we examined internal consistency reliability (composite reliability > 0.7), indicator reliability (item loading > 0.7, significant at 0.05 level), convergent validity (average variance extracted (AVE) > 0.5), and discriminant validity (low cross-loadings on the unintended constructs and the square root of the AVE is larger than the correlations between constructs) (Urbach and Müller 2011)

Formative measurement model.

To assess the formative measurement model, we examined item weights (> 0.2, significant at 0.05 level), variance inflation factors (VIFs) (< 3.3), and inter-construct correlations (the correlations between the formative construct and other constructs < 0.7) (Urbach and Müller 2011).

DATA ANALYSIS AND RESULTS

SmartPLS was used for the data analysis part of this paper. SmartPLS is one of the leading software applications for Partial Least Squares Structural Equation Modeling (PLS-SEM). It was developed by Ringle, Wende & Will (Ringle, Da Silva, and Bido 2014). The software is very popular because it has a friendly user interface and advanced reporting features.

Reliability of measurement tool

Cronbach's alpha coefficient was utilized to determine the reliability of the questionnaire. Based on the results the questionnaire has high reliability. And the details are summarized in table 3. The demographic information is shown in table 4, the Summary of the path coefficients is presented in Table 5. Table 6 summarize the items of Individual Constructs with indirect effect. Total effect is tabulated in Table 7. And Finally, the summary of the Items of Individual Constructs and the results path coefficients with indirect effect and total effect is presented in Table 8.

Table 3

CRONBACH'S ALPHA COEFFICIENT OF THE QUESTIONNAIRE

	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Attiude towards usage	**0.817**	**0.825**	**0.916**	**0.845**
Educational Sys Quality	**0.940**	**0.944**	**0.953**	**0.772**
Intention to use	**0.890**	**0.908**	**0.931**	**0.819**
Percived Ease of Use	**0.959**	**0.960**	**0.967**	**0.832**
Percived Net Benefit	**0.881**	**0.896**	**0.918**	**0.737**
Percived Usefulness	**0.963**	**0.964**	**0.970**	**0.845**
Service Quality	**0.916**	**0.921**	**0.947**	**0.856**
System Quality	**0.758**	**0.771**	**0.892**	**0.805**
User Satisfaction	**0.905**	**0.942**	**0.931**	**0.773**

Table 4

THE DEMOGRAPHIC INFORMATION COLLECTED FROM THE SAMPLES WITH THE PERCENTAGE

Demographic variable	**Percent**
Gender	
Male	71.7%
Female	28.3%
Duration of studies at KU	
1 Year	0.7%
2 Years	21.3%
3 Years	32.5%
4 Years	20.3%
5 Years	15.7%
6 Years or more	9.4%

Number of courses using	
LMS	4.2%
1 course only	25.2%
2-4 courses	26.6%
5-7 courses	44.1%
8 or more courses	
Age	
18-20 years	31.8%
21-22 years	44.8%
23-24 years	17.5%
25 or more	5.9%
District in Kuwait	
Capital	20.6%
Hawalli	23.8.%
Alfarwaniyah	19.6%
Ahmadi	11.2%
Mubarak Kabeer	11.5%
Jahra	13.3%

Table 5

PATH COEFFICIENTS

	ATU	ESQ	ITU	PEOU	PNB	PU	SQ	SysQ	US
Attitude towards usage			0.232						0.330
Educational Sys Quality			0.640						0.138
Intention to use					0.672				
Perceived Ease of Use	0.368					0.848			
Perceived Net Benefit									
Perceived Usefulness	0.477								
Service Quality			-0.059						0.337
System Quality			-0.009						0.074
User Satisfaction			0.039		0.272				

Table 6

INDIRECT EFFECT OF INDIVIDUAL CONSTRUCTS

	ATU	ESQ	ITU	PEOU	PNB	PU	SQ	SysQ	US
Attitude towards usage			0.013		0.254				
Educational Sys Quality			0.005		0.471				
Intention to use									
Perceived Ease of Use	0.404		0.189		0.196				0.255
Perceived Net Benefit									
Perceived Usefulness			0.117		0.121				0.157
Service Quality			0.013		0.061				
System Quality			0.003		0.016				
User Satisfaction					0.026				

Table 7

TOTAL EFFECT

	ATU	ESQ	ITU	PEOU	PNB	PU	SQ	SysQ	US
Attitude towards usage			(*H10*) 0.245		0.254				(*H11*) 0.330
Educational Sys Quality			(*H4*) 0.645		0.471				(*H3*) 0.138
Intention to use					(H12) 0.672				
Perceived Ease of Use	(*H7*) 0.773		0.189		0.196	(*H8*) 0.848			0.255
Perceived Net Benefit									
Perceived Usefulness	(*H9*) 0.477		0.117		0.121				0.157

Service Quality	(*H5*) -0.046	0.061	(*H6*) 0.337
System Quality	(*H2*) -0.006	0.016	(*H1*) 0.074
User Satisfaction	(H14) 0.039	(H13) 0.298	

Table 8

ITEMS OF INDIVIDUAL CONSTRUCTS AND THE RESULTS PATH COEFFICIENTS WITH INDIRECT EFFECT AND TOTAL EFFECT

Hypothesis	Path coefficient	Indirect effect	Total effect	Discussion
H1: System Quality has a positive effect on User Satisfaction.	0.074	0	0.074	Weak relation
H2: System Quality has a positive effect on Intention to use of LMS.	-0.009	0.003	-0.006	Weak relation
H3: Educational system quality is positively associated with user satisfaction with LMS.	0.138	0	0.138	Weak relation
H4: Educational system quality is positively associated with the intention to use LMS.	0.640	0.005	0.645	Substantial relation
H5: Service quality is positively associated with intention to use LMS.	-0.059	0.013	-0.046	Weak relation
H6: Service quality is positively associated with User Satisfaction with LMS.	0.337	0	0.337	Moderate relation
H7: Perceived Ease of Use has a significantly positive and direct effect on Attitude towards usage of LMS.	0.368	0.404	0.773	Substantial relation
H8: Perceived Ease of Use has positive and direct effect on Perceived usefulness.	0.848	0	0.848	Substantial relation
H9: Perceived Usefulness has a positive effect on attitude towards Usage of LMS.	0.477	0	0.477	Moderate relation

H10: Attitude towards use of LMS has a positive effect on Intention to use LMS.	0.232	0.013	0.245	Weak relation
H11: Attitude towards use of LMS has a positive effect on use satisfaction.	0.330	0	0.330	Moderate relation
H12: net benefit has a positive effect on user satisfaction.	0.672	0	0.672	Substantial relation
H13: User Satisfaction has a positive effect on Benefits of Using the System.	0.272	0.026	0.298	Moderate relation
H14: User Satisfaction has a positive effect on Intention to use	0.039	0	0.039	Weak relation

Final LMS evaluation model

Based on the outcomes of the analysis, H1, H2, H3, H5, H10 and H14 are not supported, which means the system quality has low impact of user satisfaction, and intention to use LMS and is not associated with user satisfaction. Another outcome is that service quality is not positively associated with intention to use LMS. The positive impact of attitude towards use of LMS on Intention to use LMS is also not supported in proposed model. A surprising outcome is that User Satisfaction has a no positive effect on Intention to use. The test results of proposed model are presented in Figure 3.

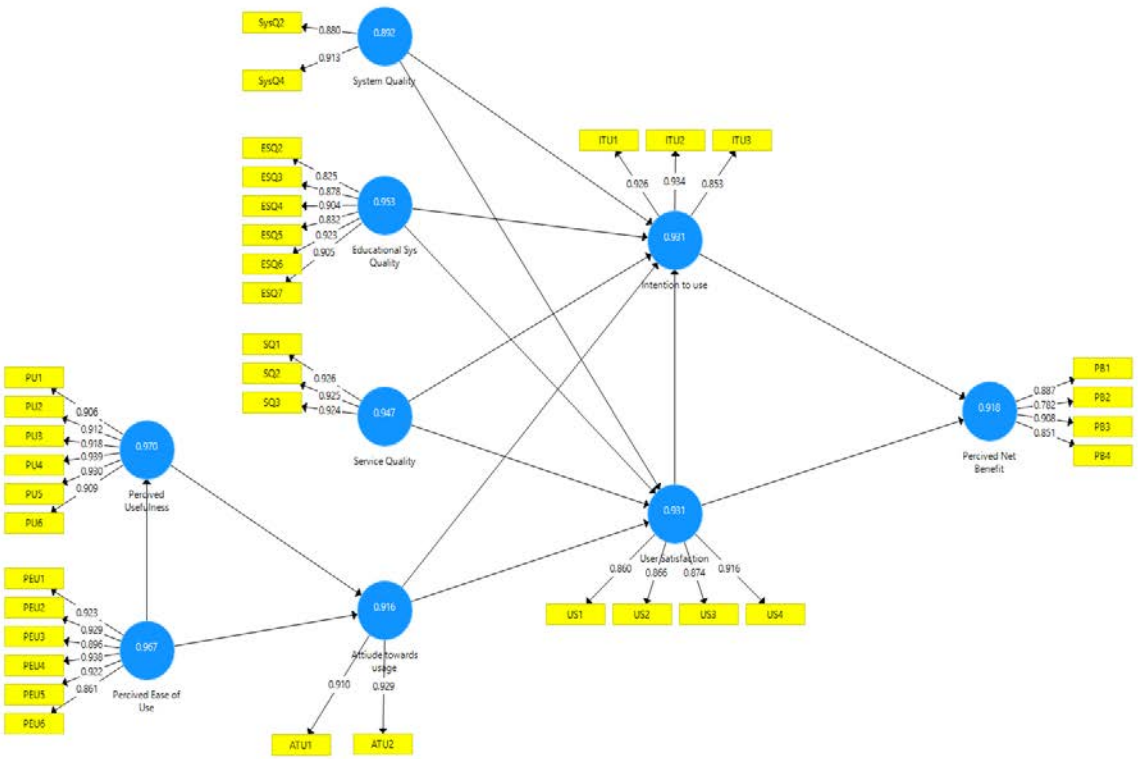

Figure 3: The proposed Blended Learning Acceptance Model test results

Discussion and conclusion

The study aimed to propose a model that could be used to evaluate the acceptance and effectiveness of LMS for systems deployed in higher education by adopting and extending DeLone and McLean's model. In determining the structure of model the construct system quality has been removed. The outcome demonstrates that user satisfaction cannot by quality of the system and services offered by IT department. Also the paths for H5, H10 and H14 have been removed as attitude towards usage and user satisfaction have no impact on intention to use the system.

Thus, the higher education intuitions should find strategies to increase users (students') satisfaction toward using the LMS. The results provide further evidence that quality of educational system quality is important for students to realize the benefit of using LMS. Similar studies conducted by (Urbach and Müller 2011, Mayoka and Kyeyune 2012) provide further evidence that the quality of courses are important for students to realize the benefits of using LMS and lecturers should develop quality course content adding value to educational benefits. The course content should be accurate. Also ease of use of LMS is an issue, where higher education institutions should work on user experience and develop

and customize a user friendly design. Figure 4 presents the final proposed model after removing unsupported paths and system quality construct.

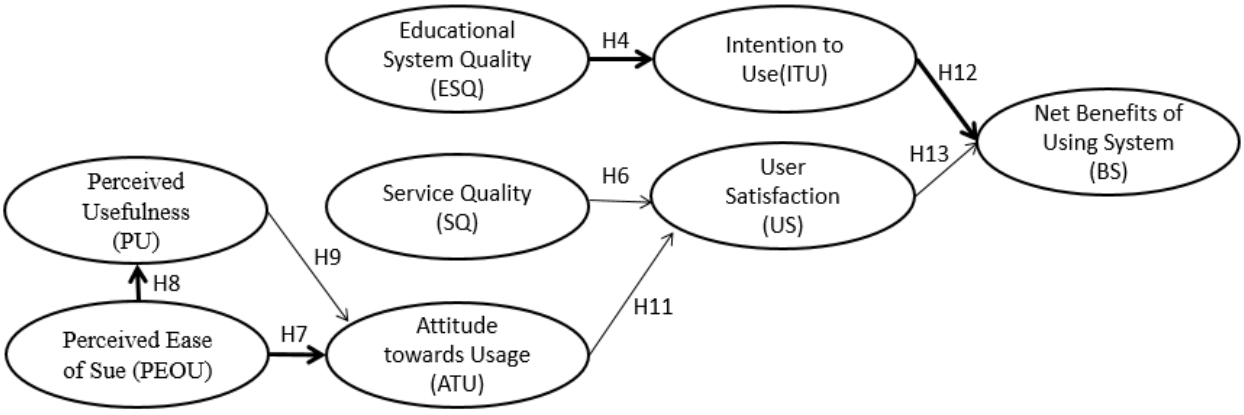

Figure 4: The final proposed Blended Learning Acceptance Model

This study has some limitations, since most of students were from college of petroleum and engineering of Kuwait University with higher homogeneity. In future research, we will target the college of Business Administration, so we can compare different categories. We also did not analyze the subjective phonological variables and there might be a common method bias. For example, we could compile the number of logins or the hours spent using LMS and frequency of interaction. Another constraint is that a lecturer might have asked students to join the survey while being in the class room and students might have scored in a different way due to presence of the lecturer. Identifying motivational factors and compassion with available historical data of LMS usage will be part of future research.

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APPENDIX A:

Measurement items used in this study is located on the following web address:

https://goo.gl/forms/GWD7HkBk0Kf3yQOs2

REFERENCES

Anderson, James C, and David W Gerbing. 1988. "Structural equation modeling in practice: A review and recommended two-step approach." *Psychological bulletin* 103 (3):411.

Arbaugh, J. B., and Alvin Hwang. 2006. "Does "teaching presence" exist in online MBA courses?" *The Internet and Higher Education* 9 (1):9-21. doi: 10.1016/j.iheduc.2005.12.001.

Babb, Stephanie, Cynthia Stewart, and Ruth Johnson. 2010. "Constructing communication in blended learning environments: Students' perceptions of good practice in hybrid courses." *Journal of Online Learning and Teaching* 6 (4):735.

Balotsky, Edward R., and Edward W. Christensen. 2004. "Educating a Modern Business Workforce: An Integrated Educational Information Technology Process." *Group & Organization Management* 29 (2):148-170. doi: 10.1177/1059601103261353.

Bliuc, Ana-Maria, Robert A. Ellis, Peter Goodyear, and Daniela Muntele Hendres. 2011. "Understanding student learning in context: relationships between university students' social identity, approaches to learning, and academic performance." *European Journal of Psychology of Education* 26 (3):417-433. doi: 10.1007/s10212-011-0065-6.

Bolliger, Doris U, Supawan Supanakorn, and Christine Boggs. 2010. "Impact of podcasting on student motivation in the online learning environment." *Computers & Education* 55 (2):714-722.

Bonk, Curtis J, and Charles R Graham. 2012. *The handbook of blended learning: Global perspectives, local designs*: John Wiley & Sons.

Boyle, Tom, and John Cook. 2003. Learning Objects, Pedagogy and Reuse. In *Learning Technology in Transition*: Informa UK Limited.

Brown, Gary, Tamara Smith, Tom Henderson, AG Picciano, and C Dziuban. 2007. "Student perceptions of assessment efficacy in online and blended classes." *Blended learning: Research perspectives*:145-160.

Churchill, Gilbert A. 1979. "A Paradigm for Developing Better Measures of Marketing Constructs." *Journal of Marketing Research* 16 (1):64. doi: 10.2307/3150876.

Churchill Jr, Gilbert A. 1979. "A paradigm for developing better measures of marketing constructs." *Journal of marketing research*:64-73.

Clouse, Shawn F., and Gerald E. Evans. 2003. "Graduate Business Students Performance with Synchronous and Asynchronous Interaction e-Learning Methods." *Decision Sciences Journal of Innovative Education* 1 (2):181-202. doi: 10.1111/j.1540-4609.2003.00017.x.

Davis, Fred D. 1989. "Perceived usefulness, perceived ease of use, and user acceptance of information technology." *MIS quarterly*:319-340.

DeLone, W. H., and E. R. McLean. 2002. "Information systems success revisited." Proceedings of the 35th Annual Hawaii International Conference on System Sciences.

Delone, William H, and Ephraim R McLean. 2003. "The DeLone and McLean model of information systems success: a ten-year update." *Journal of management information systems* 19 (4):9-30.

DeLone, William H., and Ephraim R. McLean. 1992. "Information Systems Success: The Quest for the Dependent Variable." *Information Systems Research* 3 (1):60-95. doi: 10.1287/isre.3.1.60.

Donnelly, Roisin. 2009. "Embedding interaction within a blend of learner centric pedagogy and technology."

Dziuban, CD, JL Hartman, and PD Moskal. 2004. Blended Learning." edited by Center for Applied Research EDUCAUSE, 2004.

Dziuban, Charles, Joel Hartman, Thomas B. Cavanagh, and Patsy D. Moskal. 2006

Blended Courses as Drivers of Institutional Transformation. In *Blended Learning across Disciplines*: IGI Global.

Garnham, Carla, and Robert Kaleta. 2002. Introduction to Hybrid Courses. Teaching with Technology Today 8 (10).

Garrison, D Randy, and Norman D Vaughan. 2008. *Blended learning in higher education: Framework, principles, and guidelines*: John Wiley & Sons.

Garrison, D. Randy, and Heather Kanuka. 2004. "Blended learning: Uncovering its transformative potential in higher education." *The Internet and Higher Education* 7 (2):95-105. doi: 10.1016/j.iheduc.2004.02.001.

Gefen, David, Detmar Straub, and Marie-Claude Boudreau. 2000. "Structural equation modeling and regression: Guidelines for research practice." *Communications of the association for information systems* 4 (1):7.

Gilbert, Jacqueline A, and Ricardo Flores-Zambada. 2011. "Development and implementation of a" blended" teaching course environment." *Journal of Online Learning and Teaching* 7 (2):244.

Graham, CR. 2006. Blended Learning System: Definition, Current Trends, and Future Directions. The Handbook of Blended Learning. San Francisco, CA: John Wiley & Sons.

Haenlein, Michael, and Andreas M. Kaplan. 2004. "A Beginner's Guide to Partial Least Squares Analysis." *Understanding Statistics* 3 (4):283-297. doi: 10.1207/s15328031us0304_4.

Hassanzadeh, Alireza, Fatemeh Kanaani, and Shában Elahi. 2012. "A model for measuring e-learning systems success in universities." *Expert Systems with Applications* 39 (12):10959-10966. doi: 10.1016/j.eswa.2012.03.028.

Holsapple, Clyde W., and Anita Lee-Post. 2006. "Defining, Assessing, and Promoting E-Learning Success: An Information Systems Perspective*." *Decision Sciences Journal of Innovative Education* 4 (1):67-85. doi: 10.1111/j.1540-4609.2006.00102.x.

Jiang, James J, Gary Klein, and Christopher L Carr. 2002. "Measuring information system service quality: SERVQUAL from the other side." *MIS quarterly*:145-166.

Jonas, Denise, and Bernadette Burns. 2010. "The transition to blended e-learning. Changing the focus of educational delivery in children's pain management." *Nurse Education in Practice* 10 (1):1-7. doi: 10.1016/j.nepr.2009.01.015.

Lim, Doo Hun, and Michael Lane Morris. 2009. "Learner and instructional factors influencing learning outcomes within a blended learning environment." *Educational Technology & Society* 12 (4):282-293.

Marsh, Darren, and Richard Pountney. 2009. "C-SAP scoping survey on the use of e-Learning: Perspectives from social science practitioners." *Enhancing Learning in the Social Sciences* 1 (3). doi: 10.11120/elss.2009.01030008.

Mayoka, K, and Robert Kyeyune. 2012. "An Analysis of E-learning Information System Adoption in Ugandan Universities: Case of Makerere University Business School." *Information Technology Research Journal* 2 (1):1-7.

McGill, Tanya J., and Jane E. Klobas. 2009. "A task–technology fit view of learning management system impact." *Computers & Education* 52 (2):496-508. doi: 10.1016/j.compedu.2008.10.002.

O'Toole, J. Mitchell, and Douglas J. Absalom. 2003. "The Impact of Blended Learning on Student Outcomes: is there room on the horse for two?" *Journal of Educational Media* 28 (2-3):179-190. doi: 10.1080/1358165032000165680.

Ozkan, Sevgi, and Refika Koseler. 2009. "Multi-dimensional students' evaluation of e-learning systems in the higher education context: An empirical investigation." *Computers & Education* 53 (4):1285-1296. doi: 10.1016/j.compedu.2009.06.011.

Petter, Stacie, and Ephraim R McLean. 2009. "A meta-analytic assessment of the DeLone and McLean IS success model: An examination of IS success at the individual level." *Information & Management* 46 (3):159-166.
Pituch, Keenan A, and Yao-kuei Lee. 2006. "The influence of system characteristics on e-learning use." *Computers & Education* 47 (2):222-244.
Rabaa'i, Ahmad A, and Guy G Gable. 2009. "Extending the IS-Impact Model into the higher education sector."
Ringle, Christian M., Dirceu Da Silva, and Diógenes De Souza Bido. 2014. "Structural Equation Modeling with the Smartpls." *Revista Brasileira de Marketing* 13 (02):56-73. doi: 10.5585/remark.v13i2.2717.
Saltzberg, Steven, and Susan Polyson. 1995. "Distributed learning on the world wide web." *Syllabus* 9 (1):10-12.
Sharpe, Rhona, Greg Benfield, and Richard Francis. 2006. "Implementing a university e-learning strategy: levers for change within academic schools." *Research in Learning Technology* 14 (2). doi: 10.3402/rlt.v14i2.10952.
Stacey, Elizabeth, and Philippa Gerbic. 2007. "Teaching for blended learning—Research perspectives from on-campus and distance students." *Education and Information Technologies* 12 (3):165-174. doi: 10.1007/s10639-007-9037-5.
Stone, Mischelle Taylor, and Suzanne Perumean-Chaney. 2011. "The benefits of online teaching for traditional classroom pedagogy: A case study for improving face-to-face instruction." *Journal of Online Learning and Teaching* 7 (3):393.
Taylor, Shirley, and Peter A Todd. 1995. "Understanding information technology usage: A test of competing models." *Information systems research* 6 (2):144-176.
Toth, Meredith Irvin, Audrey Amrein-Beardsley, and Teresa S Foulger. 2010. "Changing delivery methods, changing practices: Exploring instructional practices in face-to-face and hybrid courses." *Journal of Online Learning and Teaching* 6 (3):617.
Twigg, Carol A. 2003. Improving Learning and Reducing Costs for Online Learning. In *Encyclopedia of Distance Learning*: IGI Global.
Urbach, Nils, and Benjamin Müller. 2011. The Updated DeLone and McLean Model of Information Systems Success. In *Information Systems Theory*: Springer Nature.
Van de Vijver, Fons JR, and Kwok Leung. 1997. *Methods and data analysis for cross-cultural research*. Vol. 1: Sage.
Venkatesh, Viswanath, and Fred D Davis. 2000. "A theoretical extension of the technology acceptance model: Four longitudinal field studies." *Management science* 46 (2):186-204.
Wang, Minjuan, Ruimin Shen, Daniel Novak, and Xiaoyan Pan. 2009. "The impact of mobile learning on students' learning behaviours and performance: Report from a large blended classroom." *British Journal of Educational Technology* 40 (4):673-695. doi: 10.1111/j.1467-8535.2008.00846.x.
Webb, Linda D, Greg A Brigman, and Chari Campbell. 2005. "Linking school counselors and student success: A replication of the Student Success Skills approach targeting the academic and social competence of students." *Professional School Counseling*:407-413.
Williams, J. K. 2008. "The Handbook of Blended Learning: Global Perspectives, Local Designs, by Curtis J. Bonk and Charles R. Graham (Eds.). San Francisco, CA: John Wiley and Sons, 2006. 580 pages, hard cover." *Academy of Management Learning & Education* 7 (1):132-133. doi: 10.5465/amle.2008.31413871.
Woltering, Vanessa, Andreas Herrler, Klaus Spitzer, and Cord Spreckelsen. 2009. "Blended learning positively affects students' satisfaction and the role of the tutor in the problem-based learning

process: results of a mixed-method evaluation." *Advances in Health Sciences Education* 14 (5):725-738. doi: 10.1007/s10459-009-9154-6.
Wu, Jen-Her, Robert D Tennyson, and Tzyh-Lih Hsia. 2010. "A study of student satisfaction in a blended e-learning system environment." *Computers & Education* 55 (1):155-164.