# Investigating the factors influencing continuance usage intention of Learning management systems by university instructors

## The Blackboard system case

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Received 23 March 2015
Revised 27 May 2015
2 June 2015
Accepted 2 June 2015

## Abstract

**Purpose** – There is a growing demand worldwide for the adoption of Learning management systems (LMS) by academic institutions to support e-Learning platform. Yet limited research has been conducted to investigate the factors affecting its usage, particularly by university instructors. To fill this research void, the expectation-confirmation model (ECM) was used as the core framework for analysis, while additional critical independent factors related to organizational, technological and individual characteristics were added to find a better model to understand university instructors' continuance intention to use Blackboard system as a popular LMS.

**Design/methodology/approach** – Sample data were gathered from 158 university instructors at a university in the United Arab Emirates (UAE) who volunteered to participate in this study. Structural equation modeling technique was used to verify the causal relationships between the constructs.

**Findings** – Perceived usefulness (PU) affected satisfaction of Blackboard system. Both PU and satisfaction affected instructors' continuance intentions to use Blackboard system. User-interface design affected both PU and satisfaction. Technical support influenced perceived usefulness. Training influenced perceived usefulness, but it had no influence on satisfaction. Computer self-efficacy had no influence on perceived usefulness.

**Originality/value** – Based on the ECM, this study contributes significantly to the limited body of research on capturing the influence of organizational, technological and individual motivators to explain university instructors' continuance intention to use LMS.

**Keywords** Advanced web applications, Web-based education, Web-commerce and E-business, Learning management systems, Expectation-confirmation model

**Paper type** Research paper

The framework in this study is a modified model adopted from the second author's thesis in the fulfillment of Master of Science degree in Information Technology Management. The modified framework has been applied to a larger sample size and utilized different statistical tools to analyze the data. Consequently, the results are different.

International Journal of Web Information Systems
Vol. 11 No. 4, 2015
pp. 491-509

1744-0084
DOI 10.1108/IJWIS-03-2015-0008

## 1. Introduction

Due to the rapid development of information systems (IS) in higher education, academic institutions around the world are investing heavily in various Learning management systems (LMS) to deliver and manage e-Learning services (Liaw, 2008; Paechter *et al.*, 2010; Cheng, 2014; Caputi and Garrido, 2015). Indeed, LMS, such as Web Course Tools (WebCT) and Blackboard system, are considered among the most commonly used and useful types of e-Learning systems for both students and instructors in academic institutions (Sun *et al.*, 2008; Liaw, 2008; Cheng, 2014). For instructors, LMS provides different online course management features which allow instructors to post announcements and grades as well as manage quizzes and exams (Ngai *et al.*, 2007; Cheng, 2014). For students, LMS has improved their online communication with the instructors by motivating them to play an active role in the Learning process, rather than playing a passive role of receiving information through traditional methods, such as instructors and textbooks (Liaw, 2008, Tella, 2011).

Because of the huge investment of academic institutions in LMS and the vital role instructors play in supporting the e-Learning process, further research is needed to investigate the factors involved in instructors' acceptance and adoption of these technologies. Prior studies have focused mainly on the learners' perception of LMS (Yi and Hwang, 2003; Ngai *et al.*, 2007; Liaw, 2008; Limayem and Cheung, 2008; Paechter *et al.*, 2010; Tarhinia *et al.*, 2013; Chang, 2013), with less emphasis on investigating the instructors' attitude toward this technology (Sørebø and Sørebø, 2009; Al-Busaidi and Al-Shihi, 2012). This study attempts to fill this void by developing a model for the post-adoption context, based on the extension of the expectation-confirmation model (ECM; Bhattacherjee, 2001), to investigate the factors affecting instructors' continuance usage intention of Blackboard system as one of the most well-known and used LMS in academic institutions in the United Arab Emirates (UAE).

The ECM integrates the construct of perceived usefulness (PU) from the technology acceptance model (TAM; Davis, 1989) with constructs from the expectation-confirmation theory (Oliver, 1980) to investigate the influence of users' expectation of IS on satisfaction and the intention of continuance usage. The ECM postulates that users' expectations are confirmed after their initial use of the IS (confirmation), which in turn will influence their view of the advantages of the IS (perceived usefulness). In addition, both confirmation and PU will lead to users' satisfaction with the IS (satisfaction). Finally, both PU and satisfaction will influence users' intention to continue using the IS (continuance intention).

Past studies have revealed that researchers have adapted and selected different constructs from the ECM within different IS contexts, such as self-paced e-Learning tools (Cho *et al.*, 2009b), online shopping (Al-maghrabi *et al.*, 2011; Kim *et al.*, 2012), e-Learning (Chow and Shi, 2014), self-service technologies (Chen *et al.*, 2009) and computer-based assessment (Terzis *et al.*, 2013). In this study, the constructs of the ECM have been selected based on their widespread use and relevance to the LMS context. Hence, we have adopted the following constructs from ECM: PU, satisfaction and continuance intention. Furthermore, it is believed that additional extension of the ECM which incorporates other important user perceptions can help to better understand user's continuance intention of IS (Bhattacherjee, 2001). For example, Lin *et al.* (2005) have extended the ECM model by adding an additional relationship between perceived playfulness and satisfaction. Thong *et al.* (2006) have expanded the ECM by incorporating perceived ease of use and perceived enjoyment to study continuance

intention regarding e-government services in Hong Kong. Lee and Kwon (2011) have extended the ECM with familiarity and intimacy to explain why and how consumers are motivated to continue to use Web-based services.

In this study, we propose a framework which provides a comprehensive view of the critical factors that influence university instructors' PU and satisfaction of LMS and, consequently, their continuance intention to use this technology. According to our framework, these critical factors are related to the following characteristics: individual, organizational and technological. We suggest that the individual characteristics include computer self-efficacy (Ball and Levy, 2008; Sun *et al.*, 2008; Liaw, 2008; Jeong, 2011; Cho *et al.*, 2009a; Sawang *et al.*, 2013; Chen, 2014); the organizational characteristics include technical support and training (Sumner and Hostetler, 1999; Bradford and Florin, 2003; Al-Busaidi and Al-Shihi, 2012); and the technological characteristics include user-interface design (Jeong, 2011; Chen, 2014). We believe that taking into consideration these different characteristics will provide us with a more complete picture of LMS adoption and usage by university instructors.

This study is organized as follows. Following the introduction in Section 1, the research model and hypotheses are proposed in Section 2. Next, the research method used in this study is described in Section 3. The results of the collected data analyzed using structural equation modeling (SEM) are reported in Section 4. Section 5 discusses the findings of the study, and finally, Section 6 presents the implications and avenues for further research.

## 2. Theoretical background and research hypotheses

This research focuses on understanding the important factors affecting university instructors' continuance intention to use LMS. An expanded ECM was developed by incorporating critical factors related to the following characteristics: organizational characteristics (training and technical support), technological characteristics (user-interface design) and individual characteristics (computer self-efficacy) as additional post-adoption constructs into the original ECM. Figure 1 presents the research model.

### *2.1 The influence of PU on satisfaction and continuance intention*

Continuance intention is the degree to which an individual is willing to use an IS in the future and to recommend it to others (Chang, 2013). Satisfaction can be defined as the degree to which one believes that using a service derives positive feelings (Rust and Oliver, 1994). PU refers to an individual's perception that the usage of IS will improve work performance (Davis, 1989). Prior research has established that the extent to which users perceive an IS to be useful positively affects their satisfaction with using the system and their continuance intention (Lin *et al.*, 2005; Limayem *et al.*, 2007). The study of Bhattacherjee (2001) has verified that PU significantly influences satisfaction and IS continuance intention among online banking customers. Similar results have been obtained from online banking users in New Zealand (Hoehle *et al.*, 2011).

Within LMS context, Limayem and Cheung (2008) have found that PU significantly influences satisfaction and continuance intention to use Blackboard system among first-year business students in one university. Similar results have been obtained from Lee (2010), who has found that PU influences satisfaction and continuance intention among students who are offered e-Learning services in the continuing education

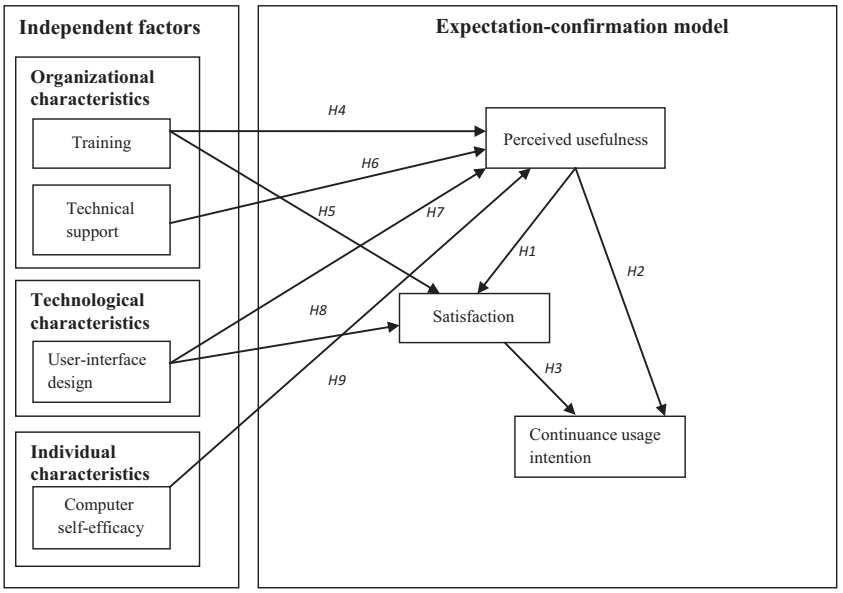



**Figure 1.**
The framework of this study

program of National Pingtung University in Taiwan. Roca *et al.* (2006) have found that PU is one of the determinants of user satisfaction toward e-Learning services in different international agencies of the United Nations. Sørebø and Sørebø (2009) have found that PU significantly influences satisfaction among university teachers who have utilized e-Learning technology in connection with on-site courses in Norway. In this study, we hypothesize that the more useful the Blackboard system is, the more university instructors will be satisfied and also inclined to continue using it. Therefore, we hypothesize the following:

*H1*. PU has a positive effect on the satisfaction with Blackboard system.

*H2*. PU has a positive effect on the continuance intention to use Blackboard system.

### *2.2 The influence of satisfaction on continuance intention*

Prior studies have demonstrated the important effect of satisfaction on continuance intention in various technologies, such as electronic banking service (Bhattacherjee, 2001; Hoehle *et al.*, 2011), accounting IS (Ali *et al.*, 2012) and mobile banking services (Kumar *et al.*, 2012). Within LMS environment, satisfaction is considered as an important factor in measuring the continuance usage intention to the support e-Learning process (Chiu *et al.*, 2007; Hung *et al.*, 2011; Ismail *et al.*, 2012). Chiu *et al.* (2005) have found that satisfaction influences the intention to continue using an e-Learning service in the continuing education program of a university in Taiwan. Similarly, Chang (2013) has found that satisfaction is one major determinant of university students' continuance intention to use e-Learning systems in an academic library in a university in Taiwan.

In this study, we draw on past research suggestions to infer that a university instructor who is satisfied with Blackboard system will have a higher level of continuance intention to use it. Thus, the following hypothesis is proposed:

*H3*. Satisfaction has a positive effect on continuance intention to use Blackboard system.

*2.3 The influence of training on PU and satisfaction*

Training is a process needed to obtain IS skills required to perform specific tasks (Nelson and Cheney, 1987). It is considered one of the organizational factors which can influence the success of IS implementation (Bradford and Florin, 2003). It can significantly influence the satisfaction of managers using new systems (Bradford and Florin, 2003) and can also be considered a suitable method to encourage users to change their attitude toward new IS (Igbaria *et al.*, 1997, Spacey *et al.*, 2003). Randeree and Narwani (2009) have found that providing an effective training program is essential to the successful implementation of an IS. Similarly, Lee (2008) has discovered that offering adequate support and training will increase the ease of use and usefulness among students using online Learning system in universities in Taiwan, which has a unified Web-based Learning system. A study by Georgina and Olson (2008) has revealed that providing training programs can improve the technical skills of university instructors and the integration of a new technology in their work.

Because of the increased use of IS in the educational field, academic institutions need to provide adequate training programs for their instructors on the use of new IS (Lareki *et al.*, 2010). Training programs can be effective for improving the level of utilization of LMS and for enabling users to obtain the benefits of this technology (Randeree and Narwani, 2009). Prior research has reported that training positively influences technology acceptance indirectly through its influence on PU (Amoroso and Cheney, 1991; Igbaria *et al.*, 1997) or user satisfaction (Bradford and Florin, 2003). Bradford and Florin (2003) have reported that training offered to users of enterprise resource planning systems significantly influences satisfaction which consequently affects their organizational performance.

In the UAE, the increased adoption of different educational IS to support instructors in higher educational institutions has led to an increase in providing suitable training programs to help instructors to quickly learn about these technologies and make effective use of them (Randeree, 2006). Hence, within LMS context, we postulate that training offered to university instructors will influence their PU as well as their satisfaction of Blackboard system. This leads to the formulation of the following hypotheses:

*H4*. Training has a positive effect on the PU of Blackboard system.

*H5*. Training has a positive effect on the satisfaction with Blackboard system.

*2.4 The influence of technical support on PU*

Researchers consider technical support one of the organizational characteristics which positively influences instructors' satisfaction with LMS within e-Learning context (Al-Busaidi and Al-Shihi, 2012). Technical support is defined as answering questions regarding IS usage and offering support to users when requested by expert individuals in help desk and information technology center (Ngai *et al.*, 2007; Bhattacherjee and

Hikmet, 2008). Prior studies have shown that technical support is a key factor influencing attitude of instructors and students (Williams, 2002). Thus, a lack of technical support will make teachers frustrated with the technology which may discourage them from using it, whereas providing appropriate technical support to teachers will help them to integrate new technologies easily into their teaching (Tong and Trinidad, 2005). Martins and Kellermanns (2004) have found that the availability of technical support indirectly influences students' acceptance of Web-based course management system through ease of use. Ngai *et al.* (2007) examine the influence of technical support on students' acceptance of WebCT in Hong Kong institutions of higher education and have found that technical support positively influences PU. Drawing on prior studies, we suggest that technical support will lead university instructors to consider the benefits of Blackboard system; thus, the following hypothesis is proposed:

*H6*. Technical support has a positive effect on the PU of Blackboard system.

### *2.5 The influence of user-interface design on PU and satisfaction*

Interface characteristics are important to the enhancement of user-interface (Jeong, 2011). A good menu design with control tool bars will enable the functions of a system to be easily accessible to the user, thus enhancing its PU (Cho *et al.*, 2009b). Several studies have examined the impact of user-interface design on user's attitude toward IS. Jeong (2011) has found that screen design significantly influences the PU of e-library systems among Korean elementary students. According to Cyr *et al.* (2006), mobile design characteristics have a significant indirect relationship with loyalty through usefulness and ease of use. Cho *et al.* (2009b) have found that perceived user-interface design of self-paced e-Learning tools indirectly influences continued usage intention through PU and perceived ease of use.

Within LMS context, a good user-interface design is an important factor for supporting user acceptance and usage of e-Learning services (Cho *et al.*, 2009b). Some researchers argue that the influence of a poor interface design is more essential in education than in business (Crowther *et al.*, 2004), as it can affect students' motivation as well as their Learning performance. Obviously, a simple and flexible user-interface will minimize the effort required to access the system, as it will help the users to easily use it (Cho *et al.*, 2009b). A study by Liu *et al.* (2010) has found that in an online Learning community focusing on Learning English, user-interface design has significant impact on ease of use. In this study, we hypothesize that Blackboard system user-interface design can enable university instructors to achieve their goals effectively, which would help them to enhance their usefulness and the satisfaction of the system. Thus, the following hypotheses are suggested:

*H7*. User-interface design has a positive effect on the PU of Blackboard system.

*H8*. User-interface design has a positive effect on the satisfaction with Blackboard system.

### *2.6 The influence of computer self-efficacy on satisfaction*

Computer self-efficacy is defined as the individual's ability to use a computer to perform a specific task (Compeau and Higgins, 1995). Prior studies suggest that computer self-efficacy is a significant determinant of an individual's decision to use computers

through PU (Agarwal *et al.*, 2000). Individuals with low computer self-efficacy are uncertain and less comfortable using computers, and therefore, they need more instructions and guidance through the process (Gong *et al.*, 2004).

In the context of LMS, it is suggested that a successful implementation of LMS to support e-Learning platform is related to the individual characteristics of the learner (Sawang *et al.*, 2013), which suggests that individuals who have high computer self-efficacy are more likely to have favorable attitude toward educational IS. Chiu and Wang (2008) have found that computer self-efficacy is one of the significant predictors of individuals' intention to continue using Web-based Learning. Similarly, results of a study by Ball and Levy (2008) have revealed that computer self-efficacy positively influences intention to use Internet-based educational technology among university instructors. They propose that management needs to increase the level of computer self-efficacy among their instructors to improve their acceptance of the technology.

In this study, we argue that instructors who have higher computer self-efficacy will recognize the usefulness and value of Blackboard system. Accordingly, the following hypothesis will be tested:

*H9*. Computer self-efficacy has a positive effect on the PU of Blackboard system.

## 3. Research methodology

### *3.1 Data collection procedures and sample*

To empirically assess the proposed model and hypotheses, we conducted a paper-based survey method as well as an online survey method to university instructors who use Blackboard system on a voluntary basis in one well-known university in the UAE. The university instructors have the option not to use Blackboard, use some of its features or all of them. Because our study focuses on users during the post-adoption stage of LMS, we targeted university instructors who used Blackboard system before, and they were assured that anonymity would be maintained. The study was conducted in three steps. First, the questionnaire was developed in English language and translated to Arabic language, as the teaching method in the university is both in English and Arabic. Two English university instructors who were experts in translation examined the questionnaire and made suggestions about the clarity of the translated items. Second, the questionnaire was pilot-tested with five randomly selected university instructors in the university. Based on the feedback from the pilot test, the questionnaire was refined and a revised final questionnaire was developed. Third, a paper-based questionnaire was self-administered by the researchers to university instructors in different colleges who volunteered to participate in this survey. Some university instructors helped the researchers by distributing the questionnaires among their colleagues and later collecting them before giving them back to the researchers. The questionnaire was also distributed online and faculty members were encouraged to complete it and send it via email to the researchers.

The researchers distributed 200 questionnaires, and they received 115 questionnaires back. Of all, 7 questionnaires were eliminated due to missing values and wrong data provided, making the number of complete questionnaires 108. To increase the response rate, a second round of follow-up was carried out by the researchers themselves making the number of returned questionnaire 167. After checking the questionnaires for completeness and any missing values, nine questionnaires were

eliminated. The final number of valid responses was 158. The profile of the respondents is shown in Table I.

*3.2 Measurement items*

The questionnaire consisted of 41 items divided into 2 main parts. The first part, which consisted of nine items, contained demographic data about the university instructors (gender, age, nationality, college, job rank, teaching experience, frequency of Internet usage and frequency of Blackboard system usage). The second part which consisted of 32 items to assess the proposed 7 constructs was measured using a five-point Likert scale ranging from 1 – strongly agree to 5 – strongly disagree, with the mid-point (3)

| Item | Category | No. | % |
|---|---|---|---|
| Gender | Male | 117 | 74.1 |
| | Female | 41 | 25.9 |
| Age | 30-39 | 33 | 20.9 |
| | 40-49 | 67 | 42.4 |
| | 50-59 | 49 | 31.0 |
| | = > 60 | 9 | 5.7 |
| Nationality | UAE national | 5 | 3.2 |
| | Arab country | 120 | 75.9 |
| | Non-Arab country | 33 | 20.9 |
| College | Sharia-Law and Arts | 29 | 18.4 |
| | Sciences | 27 | 17.1 |
| | Engineering | 32 | 20.3 |
| | Business Administration | 22 | 13.9 |
| | Fine Arts | 6 | 3.8 |
| | Medicine and Health science | 22 | 13.9 |
| | Communication | 20 | 12.6 |
| Job rank | Lecturer | 23 | 14.6 |
| | Assistant Professor | 77 | 48.7 |
| | Associate Professor | 42 | 26.6 |
| | Full Professor | 16 | 10.1 |
| Teaching language | Arabic | 46 | 29.1 |
| | English | 112 | 70.9 |
| Teaching experience | 1-5 | 43 | 27.2 |
| | 6-10 | 39 | 24.7 |
| | 11-15 | 23 | 14.6 |
| | > 15 | 53 | 33.5 |
| Minutes spent on using the Internet (per day) (minutes) | < 10 | 5 | 3.2 |
| | 10-30 | 21 | 13.3 |
| | 31-60 | 35 | 22.2 |
| | 61-120 | 42 | 26.5 |
| | > 120 | 55 | 34.8 |
| Minutes spent using Blackboard system (per day) (minutes) | < 10 | 37 | 23.4 |
| | 10-30 | 56 | 35.4 |
| | 31-60 | 46 | 29.1 |
| | 61-120 | 12 | 7.6 |
| | > 120 | 7 | 4.5 |

**Table I.**
Demographic analysis

representing the state of unsure or neutral. Measurement items in the survey were adapted from existing scales for the context of LMS. Items of organizational characteristics which include training and technical support were adapted from Al-Busaidi and Al-Shihi (2012) and Ngai *et al.* (2007). Items of technological characteristics which include user-interface design were adapted from Cho *et al.* (2009b) and Liu *et al.* (2010). Items of individual characteristics which include computer self-efficacy were adapted from Chatzoglou *et al.* (2009), Lee *et al.* (2009) and Chiu and Wang (2008). The items of the ECM constructs were also adapted from prior studies. PU was adapted from Yoon and Kim (2007) and Sørebø and Sørebø (2009). Satisfaction was adapted from Lee (2010), Chiu *et al.* (2007), Sahadev and Purani (2008) and Hung *et al.* (2011). Continuance intention was adapted from Chiu *et al.* (2005), Kim (2010) and Lee (2010). The final items are listed in Appendix.

## 4. Data analysis and results

This study has adopted a two-step approach suggested by Anderson and Gerbing (1988) for the data analysis. The first step involves analyzing the measurement model to establish the reliability and validity of the measures, while the second step tests the structural relationships of the model. SPSS was used to analyze the demographic data and to evaluate Cronbach's alpha. AMOS was used to conduct SEM to examine our measurement model and, then, to test the structural model.

### *4.1 Data analysis for the measurement model*

To test the measurement models of our model, we have examined the following:

- factor loading for each item;
- reliability of measures; and
- composite reliability and average variance extracted.

First, this study has conducted a confirmatory factor analysis (CFA) to examine if the measurement items of each construct are loaded as predicted on their respective constructs. Based on the recommended values provided in the literature, a construct should have at least two items and each item's factor loading should be greater than 0.40 (Hair *et al.*, 1998). As a result of the CFA, two items from computer self-efficacy were dropped due to low factor loading, while the factor loading of the remaining items in this study ranged between 0.592 and 0.898 (Appendix).

Second, the reliability of each measurement scale is computed by applying Cronbach's alpha. Table II indicates that the reliability coefficients range from 0.744 to 0.937, which is higher than the recommended level of 0.70 suggested in the literature (Nunnally and Bernstein, 1994; Hair *et al.*, 2006). Third, the composite reliability (CR) and average variance extracted (AVE) for each construct is then calculated. As shown in Table II, all the variables have CR which exceeds 0.70 and AVE that is higher than the recommended value of 0.50 (Fornell and Larcker, 1981). Thus, we can conclude that scales used in this study are both reliable and valid.

This study has used five goodness-of-fit indices to investigate the goodness-of-fit of the measurement model. The value of $chi^2$/df should be less than 5 (Bentler and Bonett, 1980). CFI, NFI and IFI should be 0.90 and above (Hair *et al.*, 2006). RMSEA should be below 0.10 (Anderson and Gerbing, 1988). The measurement model used in this research shows an acceptable level of fit with the sample data, as reported in Table III.

We applied the same criteria of the measurement model to test the structural model. The results were very close to the measurement model, which provides evidence that the structural model fits the observed data well, as shown in Table III. Thus, we proceed to examine the hypothesized relationships within the model.

As is shown in Figure 2, all the path coefficients are significant in our structural model, supporting all hypotheses with the exception of *H5* and *H9*. Consistent with *H1* and *H2*, PU has a positive influence on satisfaction and continuance intention. Satisfaction is also found to have a significant influence on continuance intention, supporting *H3*. Figure 2 shows that user satisfaction is a strong predictor of continuance intention than PU. The results also confirm that training has a positive influence on PU, thus supporting *H4*. Contrary to our expectation, training has no influence on satisfaction, indicating a lack of support for *H5*. Technical support is found to positively influence PU, thus supporting *H6*. Our results confirm that user-interface design positively influences PU and satisfaction, indicating support for *H7* and *H8*, where user-interface design has a stronger influence on satisfaction than on PU. Finally, *H9* was not supported, indicating that computer self-efficacy has no influence on PU.

## 5. Discussion

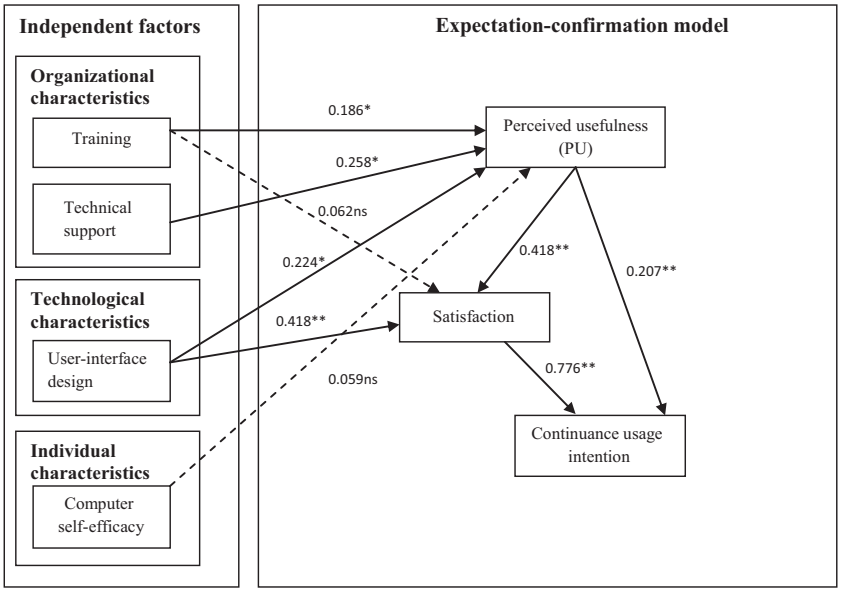
This study investigates university instructors' continuance intention to use Blackboard system as a LMS to support e-Learning platform in the UAE. Our study is motivated by the need to examine a "university instructor" perspective, which has not been highly investigated in the literature. Thus, our study is considered significant, as most prior studies have concentrated on studying the factors influencing university students' attitude toward LMS (Ngai *et al.*, 2007; Liaw, 2008; Cho *et al.*, 2009b; Lin and Wang, 2012; Liaw and Huang, 2013; Chen, 2014), while few studies have considered the university instructors perspective (Sørebø and Sørebø, 2009). In this study, we have investigated

**Table II.**
Reliability indices for constructs

| Construct | No. of items | Cronbach's $\alpha$ | Composite reliability | Average variance extracted |
|---|---|---|---|---|
| Continuance usage intention | 4 | 0.857 | 0.858 | 0.903 |
| Perceived usefulness | 5 | 0.937 | 0.931 | 0.731 |
| Satisfaction | 5 | 0.914 | 0.921 | 0.700 |
| Training | 3 | 0.818 | 0.751 | 0.563 |
| Technical support | 4 | 0.863 | 0.865 | 0.618 |
| User-interface design | 5 | 0.933 | 0.930 | 0.727 |
| Computer self-efficacy | 4 | 0.744 | 0.722 | 0.534 |

**Table III.**
CFA/SEM (goodness-of-fit measures)

| Notation | CFA model value | SEM model value |
|---|---|---|
| $Chi^2$/degree of freedom | 1164.677/443 = 2.629 | 1184.359/449 = 2.638 |
| Comparative fit index (CFI) | 0.902 | 0.903 |
| Normed fit index (NFI) | 0.901 | 0.90 |
| Incremental fit index (IFI) | 0.903 | 0.901 |
| Root mean square error of approximation (RMSEA) | 0.095 | 0.095 |




**Notes:** *$p < 0.05$; **$p < 0.001$; ns = not significant

**Figure 2.**
Results of hypotheses tests

the influence of different variables which we have grouped into three categories on the main constructs in the ECM. We believe that the results of the study will further offer scholars and researchers some insights of the influence of the proposed factors on motivating university instructors' continuance intention to use Blackboard system.

The findings of our study can be categorized into two parts. First, we examine the relationships between the ECM variables. Our findings indicate that all the hypotheses related to the direct relation between the ECM variables, namely, PU, satisfaction and continuance intention were supported. Our results are consistent with the study of Sørebø and Sørebø (2009), which has found that university teachers' continuance intention toward e-Learning technology in connection with on-site courses is influenced by both satisfaction and PU of these technologies. Similarly, Cho *et al.* (2009b) have found that both satisfaction and PU determine university students' continuance intention to use e-Learning tools in Hong Kong. Taking a closer look at the relationships between the ECM constructs, we can see that the strongest relation is between satisfaction and continuance intention to use Blackboard system ($\beta = 0.776$), and the lowest relation is between PU and continuance intention to use Blackboard system ($\beta = 0.207$). These findings suggest that academic institutions should ensure that university instructors are both satisfied and perceive the benefits of Blackboard system to continue using it, with emphasis on finding ways to satisfy their instructors to ensure their continuance intention to use Blackboard system.

Second, we examine the exogenous factors influencing the ECM variables as proposed in our model. The results have revealed that all the hypotheses pertaining to the relationships between the different exogenous factors and PU or satisfaction were supported with the exception of two relationships, the relation between

training and satisfaction and the relation between computer self-efficacy and PU. Our results indicate that the technological characteristics, represented by user-interface design, influence PU of Blackboard system. Also, we have found that having good technical support and proper training, as factors of organizational characteristics, can increase the feeling of the benefits of Blackboard system, suggesting that regular training and offering technical support to users will allow them to become familiar with LMS and, consequently, realize the benefits of these technologies. Our results are consistent with previous research, which has reported that technical support and user-interface significantly determine PU within e-Learning context (Cho *et al.*, 2009b). Our findings draw attention to the importance of the technological and organizational characteristics in influencing the PU of Blackboard system and, eventually, user continuance intention to use it among university instructors. In addition, our results show that user-interface influences satisfaction, while training has no such influence. Thus, we suggest that a good Blackboard system user-interface design allows university instructors to feel the benefits of the system and also be satisfied with it. Our result contradict with the finding of Hong *et al.* (2011), who have found that interface design has no influence on PU of digital archives system among users in Taiwan.

On the other hand, our findings have indicated that even when university instructors are offered Blackboard system training sessions, they will not be satisfied with the system. In addition, users with high computer self-efficacy will not necessarily feel the usefulness of Blackboard system. This suggests that high computer-self efficacy does not necessarily enable university instructors to perceive Blackboard system as useful and that having good training will not offer university instructors the satisfaction toward Blackboard system.

## 6. Implications and suggestions for future research

Although prior studies have investigated the post-adoption of management Learning systems from a student perspective, there has been little research examining post-adoptive continuance intention from a university instructor's perspective. This study attempts to fill this gap, and thus, its results have several theoretical and practical implications.

From a theoretical perspective, the present study offers academics and researchers several valuable implications. The results confirm that the proposed model provides a more complementary understanding of instructors' decision to continue using Blackboard system. In fact, to our knowledge, this is one of the few empirical studies which have investigated the factors influencing post-adoptive intention toward Blackboard system for university instructors. We believe that our results will encourage further research to apply our model to other management Learning systems, such as WebCT. Also, this study confirms the robustness of the ECM in explaining university instructors' perceptions toward Blackboard system within e-Learning context. This offers additional empirical validation of the power of the ECM and emphasizes its suitability as a reliable and valid measure of IS' acceptance in an educational setting.

From a practical perspective, our study has reported that PU determine satisfaction and that both satisfaction and PU positively influence continuance intention toward Blackboard system. Thus, both satisfaction and PU should be taken into account for

ensuring university instructors' continuance intention to use Blackboard system. In regard to PU, universities should organize seminars and workshops to explain the benefits of Blackboard system and familiarize the instructors with any updates of the system which can be useful to motivate them to have continuance intention to use it. As for satisfaction, our research findings have affirmed that satisfaction plays a stronger role than PU in determining university instructors' continued usage intention toward Blackboard system. When users get greater satisfaction with Blackboard system, their feelings about their intention to continue using it will increase. Thus, it is suggested that academic institutions ensure that their university instructors are satisfied with the Blackboard system by asking them regularly about their feedback and suggestions to obtain their satisfaction.

As for the exogenous factors influencing the ECM variables, this study recommends several strategies to encourage university instructors to continue using Blackboard system. The first strategy focuses on the organizational characteristics, in terms of training and technical support, and the technological characteristics, in terms of user-interface design, to emphasize the usefulness and benefits of Blackboard system. The second strategy is related to attracting customers to the Blackboard system Web site by providing a well-designed and user-friendly Web site to obtain their satisfaction.

In terms of user-interface design, our findings have revealed that when Blackboard system design is developed in a more user-friendly manner, users will be able to perceive its benefits and be satisfied with it, which will eventually encourage them to continue using it. Thus, Web developers of LMS should consider developing user-friendly systems, so that their customers will feel comfortable with the features of the Web site, which will influence their decision to continue using it. Also, having a good user-interface will allow the users to obtain the benefits of the system, which will also encourage them to consider using it again. In terms of training, universities using LMS are encouraged to provide additional flexible and voluntary training sessions for the instructors' personal development, so they can be familiar with the capabilities and the benefits of these technologies. Furthermore, universities can offer instructors personalized online training sessions, which will be customized according to their individual needs. Finally, in terms of technical support, universities can offer instructors various methods which will allow them to ask questions about any technical problem they encounter while using the LMS, such as online chatting as well as direct phone number or email. Satisfactory technical support will help instructors to become comfortable with the LMS which will lead to their understanding of the system's benefits.

The findings of this study should be interpreted with certain limitations in mind. First, this study investigates the influence of one LMS, namely, Blackboard system. However, we recommend replicating this study in other LMS to enhance the generalizability of the current findings. Second, this research was conducted in a university in the UAE, where using Blackboard system was voluntary. Thus, further research is needed to test our model in other academic institutions where using Blackboard system is mandatory. Third, this study has investigated the influence of certain variables on user continuance intention to use Blackboard system. Future research can incorporate other factors, such as computer anxiety and subjective norms, to investigate their effects. Furthermore, future research could consider investigating

the role of individual differences, such as gender and personality traits on user's continuance intention, toward LMS. Finally, this study has investigated the influence of critical factors which are related to the individual, organizational and technological characteristics on the ECM. Further research can examine the influence of other characteristics, such as environmental characteristics.

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## Appendix

| Construct | Factor loading | Measure item |
|---|---|---|
| Perceived usefulness mean = 3.97 | 0.841 | Using Blackboard increases the quality of my educational work |
| | 0.849 | Using Blackboard makes me a more productive teacher |
| | 0.892 | Using Blackboard increases my work performance |
| | 0.878 | Using Blackboard enables me to accomplish my tasks more quickly |
| | 0.874 | Overall, I find Blackboard to be useful |
| Training mean = 3.35 | 0.714 | I receive training workshops on how to use Blackboard tools |
| | 0.809 | I receive online manuals on how to use Blackboard tools |
| | 0.802 | I receive seminars on the use of Blackboard tools |
| Technical support mean = 3.83 | 0.825 | A help desk is available when there is a technical problem |
| | 0.848 | Blackboard support employee is available when there is a technical problem |
| | 0.748 | E-mail enquiries can be made when there is a technical problem |
| | 0.719 | Technical support provided by the institution helps me to use Blackboard |
| Blackboard user-interface design mean = 3.76 | 0.837 | Blackboard layout is user-friendly |
| | 0.854 | Blackboard-computerized instruction is clear |
| | 0.898 | Blackboard layout is in good structure |
| | 0.839 | The layout design of Blackboard makes it easy to read |
| | 0.861 | Overall, Blackboard user-interface design is satisfactory |
| Computer self-efficacy mean = 3.57 | 0.639 | I could complete my job using Blackboard if I had only the system manuals for reference |
| | 0.647 | I could complete my job using Blackboard if I had seen someone else using it before trying it myself |
| | 0.592 | I could complete my job using technology if someone else had helped me get started |
| | 0.656 | I could complete my job using Blackboard if I could call someone for help if I got stuck |
| Satisfaction mean = 4.02 | 0.766 | I am satisfied with the experience of using Blackboard |
| | 0.888 | I think that I did the right thing when I decided to use Blackboard |
| | 0.886 | I am satisfied with my decision to use Blackboard |
| | 0.767 | I am very satisfied with the services provided by Blackboard |
| | 0.829 | My decision to use Blackboard is a wise one |
| Continuance intention mean = 4.04 | 0.826 | I intend to continue using Blackboard in the future |
| | 0.794 | I will keep using Blackboard as regularly as I do now |
| | 0.675 | I intend to increase my use of Blackboard in the future |
| | 0.807 | I will strongly recommend others to use Blackboard |

**Note:** Two items were dropped from computer self-efficacy due to low factor loading

**Table AI.**
Measurement

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