Factors Affecting University Instructors' Continuance Intention to Use Learning Management Systems: The Blackboard System Case

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Keywords: The Expectation-Confirmation Model, Learning, Management Systems, University Instructors, Training, User-Interface Design, Technical Support, Computer Self-efficacy.

Abstract: Although academic institutions have invested heavily in Learning Management Systems (LMS) to support e-learning platform, few studies have examined the factors affecting their usage, particularly by university instructors. To fill this research gap, this study proposes a framework based on the expectation-confirmation model (ECM) to examine the influence of several critical independent factors related to organizational, technological and individual characteristics on university instructors' perceived usefulness of Blackboard system as one well-known LMS, which in turn will affect their continuance intention to use this technology. Data was gathered from 158 university instructors at a university in the United Arab Emirates (UAE). Structural equation modeling technique was used to validate the causal relationships between the different variables.

1 INTRODUCTION

Academic institutions around the world are investing heavily in various Learning Management Systems (LMS) to deliver and manage e-learning services (Cheng, 2014; Caputi and Garrido, 2015). LMS, such as Web Course Tools (WebCT) and Blackboard system, are among the most commonly used types of e-learning systems for both students and instructors in academic institutions (Sun, 2008; Liaw, 2008; Cheng, 2014). The focus of previous research has been on the student's perception of LMS (Yi and Hwang, 2003; Ngai et al., 2007; Limayem and Cheung, 2008; Paechter et al., 2010; Tarhini et al., 2013; Chang, 2013; Liaw and Huang, 2013; Chen, 2014) with less emphasis on the instructor's attitude (Sørebø et al., 2009; Al-Busaidi and Al-Shihi, 2012). This study contributes to the literature by developing a model for the post-adoption context, based on the expectation-confirmation model (ECM, Bhattacherjee, 2001), to investigate the factors affecting instructors' continuance usage intention of Blackboard system as one well-known LMS in academic institutions in the United Arab Emirates (UAE). 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: perceived usefulness and continuance intention.

In this study, we propose a framework which provides a comprehensive view of the critical factors that influence university instructors' perceived usefulness of LMS and consequently 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; 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 the following. After the introduction in section 1, the research model and hypotheses are proposed in section 2. The research

Mouakket, S. and Bettayeb, A.
Factors Affecting University Instructors' Continuance Intention to Use Learning Management Systems: The Blackboard System Case.
In *Proceedings of the 18th International Conference on Enterprise Information Systems (ICEIS 2016) - Volume 2*, pages 215-222
ISBN: 978-989-758-187-8

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 venues for further research.

2 RESEARCH MODEL

This research investigates the influence of the following characteristics: organizational characteristics (training and technical support), technological characteristics (user-interface design), and individual characteristics (computer self-efficacy) on perceived usefulness, which in turn will affect university instructors' continuance intention to use LMS. Figure 1 presents the research model.

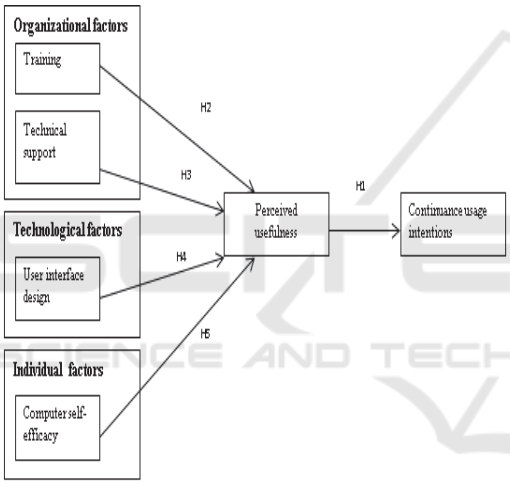

Figure 1: Research model.

Continuance intention is the degree to which an individual is willing to continue using an information system (IS) in the future and to recommend it to others (Chang, 2013). Perceived usefulness refers to an individual's perception that the usage of IS will improve work performance (Davis, 1989). Previous studies have found that the extent to which users perceive an information system to be useful positively affect their continuance intention (Bhattacherjee, 2001; Lin et al., 2005; Limayem et al., 2007, Hoehle et al., 2011).

Within LMS context, prior studies have found that perceived usefulness significantly influences continuance intention to use LMS among university students (Limayem and Cheung, 2008; Lee, 2010). Drawing on the findings of previous studies, we hypothesize that as instructors feel the usefulness of the Blackboard system, their intention to continue using it will increase. Thus, we postulate the following:

H1: Perceived Usefulness has a Positive Effect on the Continuance Intention to use Blackboard System. Training is considered one of the organizational factors which can influence the success of IS implementation (Bradford and Florin, 2003). It is a process needed to obtain IS skills required to perform specific tasks (Nelson and Cheney, 1987). Because of the increased use of information systems 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 influences technology acceptance indirectly through its influence on perceived usefulness (Amoroso and Cheney, 1991; Igbaria et al., 1997). Similarly, within LMS context, we postulate that training offered to university instructors will influence their perceived usefulness:

H2: Training has a Positive Effect on the Perceived Usefulness of Blackboard System. Technical support is another organizational characteristic which refers to answering questions regarding information systems 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, 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 Triniada, 2005). Previous studies have found that technical support positively influences perceived usefulness of LMS (Ngai et al., 2007). Drawing on prior studies, we suggest that having technical support will enhance the usefulness of Blackboard system, thus the following hypothesis is proposed:

H3: Technical Support has a Positive Effect on the Perceived Usefulness of Blackboard System. 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 perceived

usefulness (Cho et al., 2009). Several studies have examined the impact of user-interface design on user attitude towards IS (Jeong, 2011; Cyr et al., 2006). 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., 2009). In this study, we hypothesize that user-interface design of Blackboard system enable university instructors to achieve their goals effectively which would help them to enhance the usefulness of the system. Thus, the following hypothesis is suggested:

H4: User-interface Design has a Positive Effect on the Perceived Usefulness of Blackboard System.

Computer self-efficacy refers to 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 perceived usefulness (Agarwal et al., 2000). Similarity, 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:

H5: Computer Self-efficacy has a Positive Effect on the Perceived Usefulness of Blackboard System.

3 RESEARCH METHODOLOGY

3.1 Data Collection Procedures and Sample

In order to empirically assess the proposed model and hypotheses, we have 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 United Arab Emirates. Since our study focuses on users during the post-adoption stage of LMS, we have targeted university instructors who used Blackboard system before, and they were assured that anonymity would be maintained. The study is conducted in three steps. First, the questionnaire is developed in English language and translated to Arabic language since the teaching method in the university is both in English and Arabic. Two English university instructors who are experts in translation have examined the questionnaire and made suggestions about the clarity of the translated items. Second, the questionnaire is pilot-tested with 5 randomly selected university instructors in the university. Based on the feedback from the pilot test, the questionnaire is refined and a revised final questionnaire has been developed. Third, a paper-based questionnaire is self-administered by the researchers to university instructors in different colleges who volunteered to participate in this survey. Some university instructors have helped the researchers by distributing the questionnaires among their colleagues and later collecting them before giving them back to the researchers. The questionnaire is also distributed online and faculty members are encouraged to complete it and send it via email to the researchers.

The researchers distributed 200 questionnaires, and they received 115 questionnaires back. 7 questionnaires were eliminated due to missing values and wrong data provided, making the number of completed 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, 9 questionnaires were eliminated. The final number of valid responses was 158. Approximately 74% of the respondents are male while 25.9% are female. 20.9% of the respondents are between 30 and 39, while 79.1% are 40 and above. 79.1% of the respondents are Arabs while 20.9% are non-Arab. The highest number of respondents is from the engineering College, 20.3%, while the lowest numbers is from the Fine Art College, 3.8%. 48.7% of the respondents are assistant professors, while 10.1% of the respondents are full professors. The number of respondents who teach in English is 70.9%, while the number of respondents who teach in Arabic is 29.1%. Finally, 27.2% of the respondents have between 1 and years of teaching experience, while 33.5% of the respondents have more than 15 years of teaching experience. 34.8% of the respondents spend more than 120 minutes on the Internet daily. 58.9% of the respondents spend 30 minutes or less daily using Blackboard system.

3.2 Measurement Items

The questionnaire is divided into two main parts. The first part consists of 9 items. It contains 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 27 items to assess the proposed seven constructs, is measured using a five-

point Likert scale ranging from 1-strongly agree to 5-strongly disagree, with the mid-point (3) representing the state of unsure or neutral.

Measurement items in the survey are adapted from prior studies to fit the context of learning management systems. Items of organizational characteristics which include training (3 items) and technical support (4 items) are adapted from Al-Busaidi and Al-Shihi (2012) and Ngai et al., (2007). Items of technological characteristics which include user-interface design (5 items) are adapted from Cho et al., (2009) and Liu et al., (2010). Items of individual characteristics which include computer self-efficacy (6 items) is adapted from Chatzoglou et al. (2009), Lee et al., (2009) and Chiu and Wang (2008). Perceived usefulness (5 items) is adapted from Yoon and Kim (2007) and Sørebø and Sørebø (2009). Continuance intention (4 items) is adapted from Chiu et al., (2005), Kim (2010) and Lee (2010). The items of each variable are listed in the appendix.

4 DATA ANALYSIS AND RESULTS

The data has been analyzed as the following. 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 has been used to analyze the demographic data and to evaluate the Cronbach's alpha. AMOS has been used to conduct structural equation modeling (SEM) to examine our measurement model and then to test the structural model.

To test the measurement models of our model, we have examined the following: (1) factor loading for each item, (2) reliability of measures and (3) 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 factor should have at least two items and each item 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. The items and their factor loading are listed in the Appendix.

Second, the reliability of each measurement scale is computed by applying the Cronbach's alpha. The reliability coefficients range from 0.745 to 0.937 (See Appendix), which is higher than the recommended level of 0.70 suggested in the literature (Nunnally and Bernstein, 1994; Hair et al., 2006). Third, the values of composite reliability (CR) have exceeded 0.70 and the average variance extracted (AVE) is higher than the recommended value of 0.50 (Fornell and Larcker, 1981). Thus, we can conclude that the 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 and then the structural model. According to researchers, the value of Chi^2/ Degree of freedom (df) should be less than 5.0 (Bentler and Bonett, 1980). Comparative fit index (CFI), normed fit index (NFI), and incremental fit index (IFI) should be 0.90 and above (Hair *et al.* 2006). Root mean square error of approximation (RMSEA) should not exceed 0.10 (Anderson and Gerbing, 1988). All the values of the measurement model used in this research have been above the recommended values by researchers, with the exception of the value of NFI which is slightly low. The results are as the following: $Chi^2/df=638.524/238=2.683$, CFI=0.903, NFI=0.891, IFI=0.902 and RMSEA=0.090.

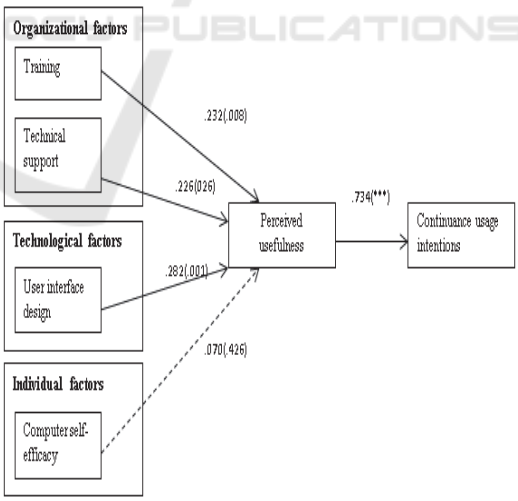

Figure 2: Results of hypotheses tests (***p<0.001, dotted line=Not significant).

The results of the structural model have been very close to the measurement model which provides evidence that the structural model fits the observed data well. Thus, we proceed to examine the hypothesized relationships within the model. As can

be shown in figure 2, all the path coefficients are significant in our structural model, supporting all hypotheses with the exception of H5. The results show that the characteristics related to the organizational and technological factors positively influence perceived usefulness, while the characteristics related to the individual factors have no impact on perceived usefulness.

5 DISCUSSION

This study investigates university instructors' continuance intention to use Blackboard system as a learning management system 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. 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 leaning management systems.

Our findings indicate that all the hypotheses related to the direct relation between perceived usefulness are supported with the exception of the influence of computer self-efficacy. First, we have found that the technological characteristics, represented by user-interface design, influence perceived usefulness of Blackboard system. Second, 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 perceived usefulness within e-learning context (Cho et al., 2009). Our findings also draw attention to the importance of the technological factors in influencing the perceived usefulness of Blackboard system and, eventually increase continuance intention to use this technology by university instructors. Thus, we suggest that a good Blackboard system user-interface design which is user friendly and simple will allow university instructors to feel the benefits of this technology, and motivate them to have continuance intention to use it. Our result contradicts with the finding of Hong et al., (2011) who have found that interface design has no influence on perceived usefulness of digital archives system among users in Taiwan.

On the other hand, our findings have indicated that users with individual characteristics represented by high computer self-efficacy does not positive influence of perceived usefulness of Blackboard system. This suggests that high computer-self efficacy does not necessarily enable university instructors to perceive Blackboard system as useful. Hence, further research is needed to validate the influence of this characteristic and its link to technology continuance adoption of LMS.

As for the relation between perceived usefulness and continuance intention, our finding shows that users who feel the benefits of the Blackboard will have positive intention to continue use it. 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 perceived usefulness of these technologies. Similarly, Cho et al., (2009) have found that perceived usefulness determine university students' continuance intention to use e-learning tools in Hong Kong.

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 perspective. This study attempts to fill this gap and thus its results have several theoretical and practical implications.

From a theoretical perspective, the results of this study suggest that our proposed model provides a better understanding of the factors influencing 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 towards 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.

From a practical perspective, our research reports that perceived usefulness positively influence continuance intention towards Blackboard system. Hence, 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 in order to motivate them to have continuance intention to use it. As for the exogenous factors influencing perceived usefulness, this study recommends considering the organizational and the technological characteristics to emphasize the usefulness and the benefits of Blackboard system.

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 website, 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 that 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. Effective technical support will help instructors to become comfortable with the LMS which will lead to their understanding of the system's benefits.

Although this study has provided valuable findings, it has several limitations. First, this study examines the influence of several factors on continuance intentions to use Blackboard system. We propose investigating the influence of those factors on other LMS to enhance the generalizability of our findings. Second, this research has been conducted in a university in the UAE, where using Blackboard system is 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 take into consideration investigating the role of individual differences, such as gender and personality traits. Finally, this study has investigated the influence of critical factors which are related to the individual, organizational and technological characteristics on perceived usefulness. Further research can examine the influence of other characteristics such as environmental characteristics.

ACKNOWLEDGEMENTS

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.

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APPENDIX

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

Construct	Factor loading	Measure item
Continuance intention α=0.857	.826	I intend to continue using Blackboard in the future
	.794	I will keep using Blackboard as regularly as I do now
	.675	I intend to increase my use of Blackboard in the future.
	.809	I will strongly recommend others to use Blackboard
Perceived usefulness α=0.937	.841	Using Blackboard increases the quality of my educational work
	.849	Using Blackboard makes me a more productive teacher
	.892	Using Blackboard increases my work performance
	.878	Using Blackboard enables me to accomplish my tasks more quickly
	.874	Overall I find Blackboard to be useful
Training α=0.818	.716	I receive training workshops on how to use Blackboard tools.
	.809	I receive on-line manuals on how to use Blackboard tools
	.802	I receive seminars on the use of Blackboard tools
Technical support α=0.863	.827	A help desk is available when there is a technical problem
	.848	Blackboard Support employee is available when there is a technical problem
	.748	E-mail enquiries can be made when there is a technical problem
	.719	Technical support provided by the institution helps me to use Blackboard.
Blackboard user-interface design α=0.933	.837	Blackboard Layout is user-friendly
	.854	Blackboard Computerized instruction is clear
	.898	Blackboard Layout is in good structure
	.839	The layout design of Blackboard makes it easy to read
	.861	Overall Blackboard user-interface design is satisfactory
Computer self-efficacy α=0.745	.639	I could complete my job using Blackboard if I had only the system manuals for reference
	.647	I could complete my job using Blackboard if I had seen someone else using it before trying it myself'
	.592	I could complete my job using technology if someone else had helped me get started
	.658	I could complete my job using Blackboard if I could call someone for help if I got stuck