Using the Technology Acceptance Model in Understanding Academics' Behavioural Intention to Use Learning Management Systems

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Abstract—Although e-learning is in its infancy in Saudi Arabia, most of the public universities in the country show a great interest in the adoption of learning and teaching tools. Determining the significance of a particular tool and predicting the success of implantation is essential prior to its adoption. This paper presents and modifies the technology acceptance model (TAM) in an attempt to assist public universities, particularly in Saudi Arabia, in predicting the behavioural intention to use learning management systems (LMS). This study proposed a theoretical framework that includes the core constructs in TAM: namely, perceived ease of use, perceived usefulness, and attitude toward usage. Additional external variables were also adopted—namely, the lack of LMS availability, prior experience (LMS usage experience), and job relevance. The overall research model suggests that all mentioned variables either directly or indirectly affect the overall behavioural intention to use an LMS. Initial findings suggest the applicability of using TAM to measure the behavioural intention to use an LMS. Further, the results confirm the original TAM's findings.

Keywords—Technology Acceptance Model; Higher education; Learning management systems; Saudi Arabia

I. INTRODUCTION

The rapid development of information and communications technology (henceforth ICT) makes using ICT imperative. The interest in ICT has drawn substantial research attention[1], and more importantly, ICT contributes directly to the significant changes in teaching and learning that have been occurring in regards to e-learning[2]. The increasing access to ICT creates a new paradigm for education known as e-learning. Therefore, universities around the world have started to revise their strategies in order to adopt technologies that assist in achieving their pedagogical goals. E-learning is commonly defined as the intentional use of ICT in teaching and learning[3].

One of the ICT tools that is incorporated into the education sector is called a learning management system (henceforth LMS). LMS is one of the rapidly-emerging technologies that is widely used in higher education, whether in open-source (Moodle) or commercial LMS such as Blackboard[4]. Paulsen [5] argues that the availability of LMS is considered a critical factor in the success of e-learning. An LMS, alternatively called a learning platform, refers to a wide range of systems that assist teachers and students alike in accessing online learning services [6]. Services provided by an LMS vary from one system to another. However, common services available in an LMS may include access control, performance management, communication facilities, assessments, study schedule documentation, and provision of learning content[7]. Current reports show that more than 95% of all responding universities and colleges in the USA have adopted one or more LMS[8] and that the same adoption rate exists in institutions in the UK[9]. The trend of using LMS in the Middle East is not different. LMS is a promising tool around the globe, including in the Middle East[10]. According to a survey, outcomes about e-learning services provided by 26 Arab universities reveals that 96% adopt LMS as a learning environment to assist in providing blended learning [11]. Blended learning is a term usually used interchangeably with e-learning in the literature involving e-learning in Arab world. In the Gulf Cooperation Council, the education sector has taken care in designing strategic plans to incorporate e-learning[12].

An effective implementation of LMS should highly consider academics who will use such systems for teaching. Therefore, the aim of this research is to develop a theoretical framework based on a well-known technology acceptance model (TAM)[13]. The proposed model contributes to the high volume of research on e-learning in Saudi Arabia, and it will be used to measure academics' behavioural intention for using an LMS. The model is presented in depth in a separate section. The rest of the paper is structured as follows: first, LMS in Saudi Arabia is presented. Then, a brief review on the previous studies of LMS usage in Saudi Arabian higher education is presented, followed by the theoretical framework on which the research model was based. The research context and significance appear next, followed by the methodology section, which provides insight into the research model and hypothesis development. The research methodology section includes a comprehensive structure about the method of validation for the proposed model. The results and discussion are provided prior to the research conclusion and future considerations.

II. LITERATURE REVIEW

A. LMS in Saudi Arabia

In Saudi Arabia, although e-learning is in its infancy, most of the Saudi universities keep pace with the development of e-

learning around the world. All governmental universities in Saudi Arabia have a deanship for e-learning and distance learning, created to assist with matching this development and meeting the need to utilise e-learning at universities. The Ministry of Higher Education has initiated an ambitious plan in its establishment of the National Centre for E-learning and Distance Learning (NCeDL). The centre was established to assist in the plan of providing educational tools for local universities[14]. NCeDL contributes to the e-learning industry in the kingdom by providing services and solutions to the local universities. One of the solutions developed locally by the National Centre is an LMS called JUSUR[15]. JUSUR provides academics with features to facilitate their teaching experience, like course and user-management tools, forums, quizzes, and announcements. It also assists in managing the e-learning process by keeping students' data organized, planning courses, making content available to students, tracking students' performance and producing reports about it, facilitating communications with students, and offering testing and assessment tools [16].

JUSUR is hosted and managed by NCeDL. Academics who wish to use the system can register for it by filling out a registration form to create their profiles. Once registered, the NCeDL registration system verifies their academic email. Once verified, the account will be approved and activated. Despite the ease of joining, JUSUR has not been adequately utilised by academics in Saudi Arabia[16]. The highest usage of JUSUR occurs at King Saud University, one of the largest universities in Saudi Arabia. As yet, however, only 55% of the courses at the university are offered through the system. Similar results were reported by [17], who found that the overall utilisation of LMS fell below the satisfactory level. The results of these studies are consistent with another study that showed the harnessing of LMS to accomplish pedagogical benefits in higher education has yet to reach the required level of use[18]. JUSUR LMS has not been the only e-learning system used at Saudi universities. Other commercial LMS such as Blackboard, WebCT, and Design2Learn have been adopted. However, [19] pointed out that only a few faculty members have utilised these systems at each university. Reflecting this issue, a growing number of studies have been conducted on the use of e-learning technologies, whereas research focusing on LMS use receives little attention and remains relatively insufficient. The following section provides the roadmap for these studies.

B. Previous studies on LMS in Saudi Arabia

First, it is noteworthy that e-learning is commonly used in place of blended learning in Saudi Arabia. A plethora of studies have examined e-learning in the context of Saudi Arabia; however, little has emerged on LMS usage.

A high percentage of these studies have targeted learner usage of LMS, specifically JUSUR LMS, whereas academics receive only a little attention. Further, most of the studies focus on examining the volume of LMS usage, features used within an LMS, and attitudes towards using such systems. Hence, the previous studies did not target the intentions and behaviours of LMS users. Most importantly, use of the technology acceptance model within LMS in Saudi context is virtually non-existent. Moreover, studies only consider user groups that

have already utilised an LMS. The potential users of LMS, however, are not considered.

Alebaikan and Troudi [20] investigated the use of JUSUR LMS for blended learning in the College of Applied Studies and Community Services at King Saud University. Prior to Alebaikan and Troudi's study [20], an LMS had already been implemented by the faculty to serve the high number of students applying to the college. Their study aimed to interpret students' and academics' perception of a new learning environment with a focus on online discussion features in LMS. From the instructors' point of view, the study concluded that lack of pedagogical and technical experience is an issue in using the Web as a medium of instruction. Further, not all features needed by instructors are available within an LMS. As this study was conducted in one of the largest and most advanced universities in Saudi Arabia, technology integration in teaching within this context could consequently be affected by organizational arrangement[21]. Further, facilitating conditions in which academics would be likely to have more resources and assistance would affect the intention to use the system[22] as they will receive the required support when they need. In addition, Mulkeen [23] suggests that ICT infrastructure should be considered when investigating LMS usage. Finally, it is noted that this study focuses only on online discussion featured within learning management systems that were provided to academics and students prior to the study.

In an attempt to further analyse academics' use of LMS in Saudi Arabia, Asiri, Mahmud, Abu-Bakar, and Ayub [24] suggests a theoretical framework in an attempt to identify factors that influence JUSUR LMS utilisation in public universities in Saudi Arabia. This study is based on the library research approach, and the theoretical framework proposed by the authors was constructed based on well-known theories— namely, the theory of reasoned action[25] and the technology acceptance model[13]. In this study, factors that influence the use of JUSUR LMS are divided into two main categories: internal variables and external variables. First, internal variables consist of three factors that could affect potential users of JUSUR LMS in terms of their attitude, pedagogical beliefs towards e-learning, and level of competency. The authors confirmed that a positive attitude towards JUSUR LMS will likely motivate academics to utilise it. Further, along similar lines with other studies[26, 27], beliefs about e-learning were found important in determining the use of JUSUR LMS. Moreover, the study noted that the use of JUSUR LMS could be predicted by competence level, meaning that having the skills and knowledge to use the system will affect an academic's use of the system. Second, the external variable indicated in this study includes external barriers faced by academics as well as demographic factors. Barriers such as organisational, technological, and social barriers were hypothesised to serve as factors that determine JUSUR LMS usage. Similarly, demographical factors such as gender, computer self-efficacy, and training are also used to predict JUSUR LMS usage.

In a different study, Asiri, Mahmud, Abu-Bakar, and Ayub [28] studied faculty members' utilisation of JUSUR LMS at three public universities in Saudi Arabia and their attitude towards such utilisation. Like the previously-mentioned study,

this study targeted academics who have already utilised LMS to assist them in teaching. The study aimed to determine the volume of JUSUR LMS utilisation that constitutes a moderate level. It is noteworthy that, according to the study, the moderate level is explained as the use of LMS for less than one hour on average twice a month. However, the finding of this study is not consistent with that of other studies mentioned earlier, wherein LMS usage is believed to be below the satisfactory level. Nevertheless, the study confirms that faculty members have a positive attitude towards JUSUR LMS.

In the same way, Hussein [16] studied the attitude of faculty members in Saudi universities towards JUSUR LMS. Similar to other studies, academics in these universities had developed a sufficient awareness and positive attitude towards JUSUR LMS. Despite that, the study confirmed their low level of JUSUR LMS usage, which was not justified within the study.

Similar to the study above, Albalawi and Badawi [29] conducted a study targeting faculty members of the University of Tabuk, which is a public Saudi Arabian university. The study aimed to highlight academics' perception and awareness of e-learning. Surprisingly, the study revealed that almost 63% of faculty members had a negative perception of e-learning. It is worth mentioning that this study was conducted prior to any implementation of e-learning technologies at Tabuk University, making the situation similar to the current study in terms of the absence of LMS.

Other research exists on acceptance of e-learning in general, with a focus on LMS systems. However, this research has used students as subjects [30-33], and students are outside of the current study's research scope.

The main limitation of the previous studies, however, is that they mostly focus on measuring the attitude of faculty members towards already-implemented LMS systems. In other words, most of the existing research focuses on users who have already used an LMS in teaching. Therefore, intention to use an LMS by those who have not used one is not considered. Moreover, although higher education providers in Saudi Arabia are implementing LMS, little has been done to examine the factors that influence academics to use an LMS. Further, the previous studies limited their scope to an examination of the use of JUSUR LMS in Saudi Arabia. However, as stated earlier, JUSUR LMS is not the only LMS employed in Saudi Arabian public universities[11]. In this study, an LMS is defined as any LMS that is either centrally-managed and government-run or privately adopted in a public university.

In response to this gap in literature, this paper develops a research model based on the technology acceptance model (TAM). The following section presents the theoretical framework of the study.

III. THEORETICAL FRAMEWORK

From the stream of research on information systems (IS), many theories have been proposed to explain the relationship between determinants that would affect technology acceptance. The most common factors are user attitudes, perceptions, beliefs, and actual system use. Frameworks such as the theory of planned behaviour (TPB)[25], diffusion of innovation[34],

the unified theory of acceptance and use of technology (UTAUT)[22, 35], the DeLone and McLean model of IS success[36], and measurement and analysis of computer user satisfaction[37, 38] are popular models used in the context of technology acceptance. Most of these models, however, focus on only technical factors[4].

The technology acceptance model (TAM)[13] is possibly the most widely-used framework in the field of IS for measuring technology acceptance[4, 39-41], and its high validity has been proven empirically in many previous studies[42-44]. Further, Al-Gahtani [45] confirms the validity and reliability of TAM constructs to predict IS adoption in Arab culture, specifically in the Saudi culture. In relation to e-learning and LMS, TAM has also been adopted and tested[46, 47]. Although TAM is a well-known and tested theory in the field of IS, using TAM in predicting and explaining LMS usage has so far received little attention[48].
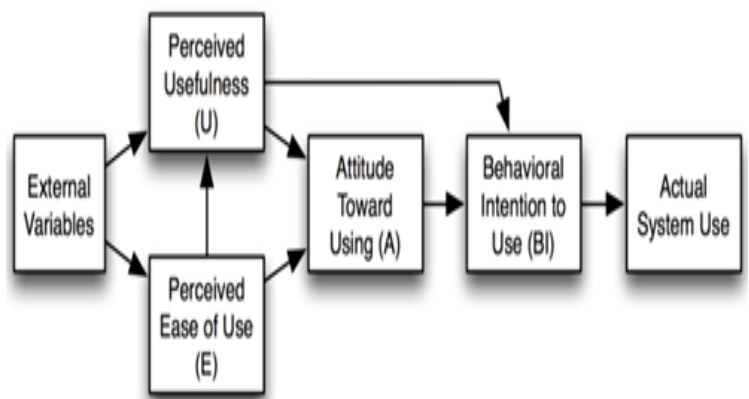

Fig. 1. The technology acceptance model[13]

TAM was first introduced by Davis [49] around the concept of technology acceptance. As depicted in Figure 1, TAM posits that acceptance of a new IS can be predicted based on users' behavioural intention (BI), attitude towards use (A), and two other internal beliefs: perceived usefulness (U) and perceived ease of use (E). Davis[13] defined perceived usefulness as "the prospective user's subjective probability that using a specific application system will increase his or her job performance within an organizational context" (p. 985) and perceived ease of use as "the degree to which the prospective user expects the target system to be free of effort" (p. 985).

According to TAM, behavioural intention (BI) defines the actual use of a given IS system and therefore determines technology acceptance. Attitude towards use (A) and perceived usefulness (U) jointly influence BI (A). BI is also indirectly affected by perceived ease of use (E). A is directly affected by both U and E, while U is directly influenced by E. Further, TAM theorizes that perceived usefulness and perceived ease of use are affected by external variables. Thus, U and E mediate the effect of external variables on user's attitude and behavioural intention, and therefore the actual system use.

A. Shaqra University

Shaqra University is a public university established in 2008, located in Shaqra, Saudi Arabia. In addition to the main campus, there are eight other campuses in geographically

distributed locations that include a total of twenty-one colleges and approximately twenty departments. The latest figures[50] show a total of 761 faculty members and 10,767 enrolled students. Table 1 provides information about the different campuses, colleges, departments, and faculty members' ranks.

TABLE I. Shaqra University Demographics

Faculty Member Statistics					
Professors	*Associate Professors*	*Assistant Professors*	*Lecturers*	*Instructors*	*Total*
15	35	200	281	230	761
Campuses and Faculties					
Total campuses	*Faculty/ Colleges*			*Departments*	
9	21			20	

In line with the national strategic plan, Shaqra University shows interest in incorporating ICT into learning and teaching practices. The university regularly participates in conferences hosted by the ministry of higher education in Saudi Arabia. In addition, soon after the establishment of the university, the deanship of information technology and e-learning was also established. The aim of this initiative is to provide both academics and students with pedagogical and technical support. Moreover, different workshops have been held to raise faculty members' awareness of e-learning. As yet, however, face-to-face teaching is the official medium of instruction at the university.

B. Study significance

The significance of the current study stems from various considerations. First, no previous research has sought to investigate faculty members' behavioural intention to use LMS and empirically validate the technology acceptance model at Shaqra University. Moreover, the findings of this study will provide the university with more insight into academics' perception of LMS. Further, this study will pave the way for future research on technology acceptance within the higher education context in Saudi Arabia. Specifically, this study adopted and modified a questionnaire to suit the LMS acceptance context that may be reused in future research.

IV. RESEARCH MODEL AND HYPOTHESES

The research model is applied to two different groups: academic users and academic non-users. Those in the user group are examined based on their current use of an LMS or their previous experience of usage. Due to their potential to use an LMS, a non-user group is also examined. According to Taylor and Todd [51], TAM has successfully predicted and explained almost equal behavioural intention to adopt a new technology among inexperienced and experienced users. Further Shih [52] noted that TAM can be applied prior to the adoption of a new technology.

In accordance with the research objective and consistent with the related literature, the research model, as shown in Fig. 2, consists of the TAM core constructs and three key moderators. The following section discusses the development of relevant hypotheses.

A. Hypotheses in relation to TAM variables

As previously discussed, TAM proposed the following relationship between its constructs: a) Intention to use is positively affected by attitude toward using and perceived usefulness; b) Attitude toward using is positively affected by perceived usefulness and perceived ease of use; and c) perceived usefulness is directly affected by perceived ease of use. In this study, perceived usefulness is defined as the degree to which a faculty member believes that using an LMS would enhance his or her job performance, while perceived ease of use is defined as the degree to which a faculty member believes that learning to use an LMS requires a relatively low degree of effort. The linkage between the different variables has been proven by different studies on e-learning and LMS usage [31, 53-56]. Therefore, the relationships between perceived ease of use, perceived usefulness, attitude toward using, and intention to use an LMS system are hypothesised as the following:

1) Perceived ease of use positively affects perceived usefulness of an LMS.

2) Perceived ease of use positively affects attitudes towards using an LMS.

3) Perceived usefulness positively affects attitudes towards using an LMS.

4) Perceived usefulness positively affects intention to use LMS.

5) Attitude towards using positively affects intention to use LMS.

Ong, et al. [57] highlights that intention to use e-learning is also effected by perceived ease of use. Therefore, the relationship between perceived ease of use and behavioural intention for use is hypothesised as:

6) Perceived ease of use positively affects intention to use an LMS.

B. Hypotheses in relation to external factors and TAM variables

The ease of use and usefulness constructs may not be sufficient, and therefore other variables may be needed[58]. Thus, after reviewing the relevant studies, this study suggests three external variables: LMS usage experience, job relevance, and lack of LMS availability. As in figure 2, researchers believe that the suggested external variables moderate the original TAM variables. The following explains the hypotheses on the relationship between external moderators and TAM variables.

Venkatesh and Davis [59]found that experience using technology serves as a critical factor in determining technology acceptance. Thompson, et al. [60] defines usage experience as individual involvement in or exposure to a particular system and the accumulative skills the user gains by using the system. In this study, LMS usage is suggested to moderate TAM variables. LMS usage is defined as academics' previous or current use of an LMS as a medium of instruction within an e-learning environment. Therefore, the following is hypothesised:

7) LMS usage experience negatively influences the non-user group's intention to use an LMS.

8) LMS usage experience negatively influences the non-user group's perceived ease of use of an LMS.

9) LMS usage experience negatively influences the non-user group's perceived usefulness of an LMS.

TAM was extended to incorporate job relevance as a factor that directly affects perceived usefulness [59]. According to Venkatesh and Davis [59], job relevance is "an individual's perception regarding the degree to which the target system is applicable to his or her job" (p.191). Similarly, this study proposes that job relevance affects both perceived ease of use and perceived usefulness. Job relevance in this study is defined as an academic's perception regarding the degree to which an LMS system is relevant to use in managing learning activities at Shaqra University. As found by Venkatesh and Davis [59], job relevance is believed to positively exert a direct effect on perceived usefulness. Consequently, this study argues that job relevance also affects perceived ease of use (PEOU). Therefore, the following are the hypotheses of this study on the relationship between job relevance and TAM variables:

10) Job relevance positively affects the perceived usefulness of an LMS.

11) Job relevance positively affects the perceived ease of use of an LMS.

C. Hypotheses on the relationship between lack of LMS availability and TAM variables

At the present, Shaqra University provides no LMS to faculty members. Therefore, as mentioned earlier, academics at Shaqra University can be categorised into the following groups in relation to LMS usage: a) experienced members who have used, and/or are using an LMS in their teaching, or b) inexperienced members who have not utilised an LMS yet. For both categories, the study proposes that a lack of LMS availability has a negative impact on perceived ease of use (E).

Therefore, the relationship between lack of LMS availability and perceived ease of use is hypothesised as following:

1) H12 Lack of LMS availability negatively affects the perceived ease of use of an LMS.

V. RESEARCH METHOD

The study is quantitative in nature and employs an online survey for data collection. Online surveys provide researchers with various benefits[61], saving researchers time and expenses by overcoming geographic distance. Moreover, they assist in accessing unique subjects. Due to Saudi Arabia's gender-segregated higher education system, the online survey was the appropriate tool to use in order to access both male and female participants. The online survey was developed to examine the relationship between variables proposed in the research model.

A. Questionnaire

To ensure content validity, the questionnaire used in this study was adapted from the original measurement scales used in TAM[13] and from other literatures[31, 55, 59, 62] with some modifications and the necessary wording changes and validation to fit the context of LMS usage. To avoid issues that can occur in wordings, measurement and ambiguities, the questionnaire was pre-tested by two native English speakers. Sekaran and Bougie [63] highlight that such pre-test is essential because wording problems significantly influence accuracy[64]. The questioner was also translated into Arabic because most of the academics at Shaqra University are native Arabic speakers. For the Arabic version, the back translation method suggested by [65] is used. This method suggests that the questionnaire measurements should be translated by bilingual experts back and forth from the source language to the targeted language. Based on that concept, the English version was sent to two bilingual experts to translate it into Arabic, and the back translation method was followed until the English and Arabic version converged. Finally, the Arabic version was also revised by an expert in the Arabic language for clarity.
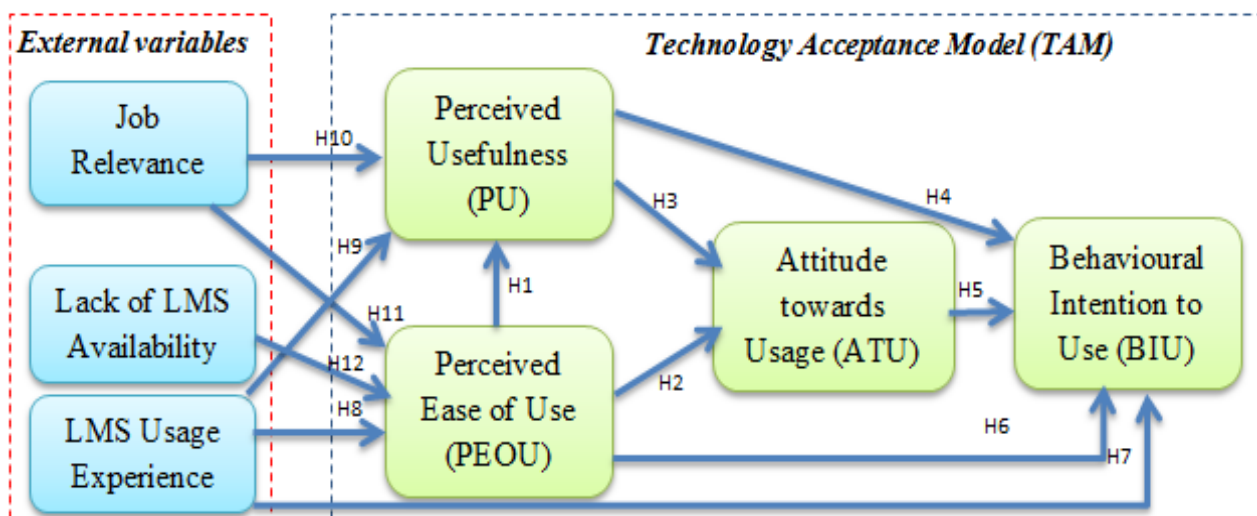

Fig. 2. Research Model

B. Participants

The participants in this study were 59 faculty members from different colleges and different departments who voluntarily participated in the online survey. All participants in this study were academics working for Shaqra University, who fit well with the aim and context of this study.

C. Sampling technique

While it is difficult to get responses from a whole population, sampling is an attempt to draw a conclusion based on a small representation in a given population[66]. The sample in this survey is considered a subset of academics at Shaqra University, comprised of some faculty members selected from the institution. The sampling technique used in the present study is non-probability convenience sampling. Convenience sampling is found used in many studies investigating technology acceptance. Further, the technique is used to ensure a better response rate in a short amount of time. Finally, it is against Shaqra University privacy policies to obtain academics' contacts and email addresses from the faculty or its departments. Additionally, using the university's mailing list may have led to the inclusion of other participants who are out of this study scope and therefore distort the findings. Hence, convenience sampling was the optimal technique for the purpose of this study.

D. Instrumentation

The research instrument consists of two main sections. The first section incorporates a nominal scale to identify respondents' demographic information. The second section uses 7-point Likert response scale where 7: Strongly disagree, 6: Moderately disagree, 5: Slightly disagree, 4: Neutral, 3: Slightly agree, 2: Moderately agree, and 1: Strongly agree. This section includes TAM constructs.

E. Demographic characteristics

This part of the questioner identifies respondents' basic demographic characteristics. It contains 10 items such as gender, age, teaching experience, academic rank and administration position, academic field, faculty and departmental information, and previous experience with LMS (Table 2).

F. Measuring TAM constructs

The second section of the survey(Table 3), as discussed in the questionnaire design above, measures TAM constructs used in this study. As shown in table 3, there are 20 items measured in accordance with the current study's research model. The measured items include perceived ease of use (7 items), perceived usefulness (6 items), attitude toward usage (3 items), behavioural intention to use (2 items), and job relevance as an external factor (2 items). It is noteworthy to mention that the seven items used to measure perceived ease of use include one item—lack of LMS availability—that is hypothesised in this research to moderate perceived ease of use.

TABLE II. Questionnaire – Section I

Section I: Demographic Characteristics Information
- Gender:
1.   Male
2.   Female
- Age
1.   Less than 25
2.   25-30
3.   30-40
4.   40-50
5.   Above 50 years old
- Experience in higher Education(In general, not only at Shaqra University)
1.   Less than 1 year
2.   More than 1 year and less than 3 years
3.   More than 3 years and less than 5 years
4.   More than 5 year and less than 10 years
5.   More than 10 years
- Experience at Shaqra University
1.   Less than 1 year
2.   More than 1 year and less than 2 years
3.   More than 2 years and less than 5 years
- Academic Rank
1.   Professor
2.   Associate Professor
3.   Assistance Professor
4.   Lecturer
5.   Instructor
- Your Academic administrator position
1.   Vice-rector or deputy vice-chancellor
2.   Dean
3.   Associate Dean
4.   Department chairman
5.   Centre director
6.   None
- Your academic field
1.   Humanities & Social Sciences
2.   Natural Sciences
3.   Applied Sciences(e.g. engineering, computing& IT)
4.   Medical & Health Sciences
- What is your Faculty?
- What is your department?
- How long have you used, or have been using a Learning
- Management System (LMS)?
1.   Have not used a System Management System
2.   Less than a year
3.   1-3 years
4.   3-5 years
5.   More than 5 years

G. Data collection

The questionnaire was made available at the beginning of academic year 2013/2014. The survey was distributed online by emailing a convenient sampling of 105 academics with the URL to the survey. Participants had the option to switch between English and Arabic at any time during the survey. At this time, of the 105 questionnaires distributed, 69 responses were recorded (65.71%). Of that, only 59 responses yielded valid responses that were used for analysis. The overall response rate was 56.19%.

TABLE III. Questionnaire – Section II

Section II: Perceived Ease of Use (PEU)	
I feel that using an LMS would be easy for me	PEU1
I feel that my interaction with LMS would be clear and understandable	PEU2
I feel that it would be easy to become skilful at using LMs	PEU3
I would find LMS to be flexible to interact with	PEU4
Learning to operate LMS would be easy for me	PEU5
it would be easy for me to get LMS to do what I want to do	PEU6
I feel that my ability to determine LMS ease of use is limited by my lack of experience	PEU7
Section III: Perceived Usefulness (PU)	
Using LMS in my job would enable me to accomplish tasks more quickly	PU1
Using LMS would improve my job performance.	PU2
using LMS in my job would increase my productivity	PU3
Using LMS would enhance my effectiveness on the job.	PU4
Using LMS would make it easier to do my job	PU5
I would find LMS useful in my job	PU6
Section IV: Attitude Toward Usage (ATU)	
I believe it is a good idea to use a Learning Management System	ATU1
I like the idea of using a Learning Management System	ATU2
Using a Learning Management System is a positive idea	ATU3
Section V: Behavioural Intention to Use (BIU)	
I plan to use a learning Management System in the future	BIU1
Assuming that I have access to an LMS, I intend to use it	BIU2
Section IV: Job Relevance (BIU)	
In my job, the usage of a learning Management System is important	JR1
In my job, the usage of a learning Management System is relevant	JR2

H. Ethical issues

Ethical clearance was obtained prior to the study. Participation in this study was voluntary and data was collected anonymously. This study did not involve personal information about subjects. Prior to commencing the survey in this study, all participants were made aware of the research significance and type of information being collected. The researchers explained that the participation in this research is based on subjects' interest, that they are under no obligation to participate, and that they may decline to participate at any time. Their right to withdraw at any time during the survey was explicitly stated. Further, data confidently was assured. Data collected from this research is to be kept confidential.

I. Procedure

In accordance with the hypotheses of the present study, a presentation was designed about LMS. The presentation consists of three main parts. The first provides a general overview about e-learning and presents its basic definition. The second part introduced LMS as a tool used in e-learning. The second part, in turn, includes basic definitions of LMS, describes its main features and components, and provides examples of various examples of LMS. The third part encloses a video presenting a local university experience with e-learning. The presentation was made available in English as well as Arabic. The presentation was designed using Prezi, which is a cloud-based presentation software program that presents ideas in a non-liner manner[67]. It incorporates map-like features to allow users to highlight the concepts that are most important to them and the relationships between these concepts while providing ease of navigation.

As mention earlier, the present study assumes that participants are mainly experienced (referred to as a user-group) and inexperienced (the non-user group) with regard to LMS usage. Within the questionnaire structure described above, all participants had access to the demographic section, which is presented first. At the end of this section, participants were asked whether or not they had previous experience with LMS. Based on their response to this question, participants were directed to the appropriate following section. If they answered that they had no previous experience and proceeded, the following section embedded the presentation described earlier. After the presentation concluded, the non-user could proceed to Section 2, about the perceived ease of use. On the other hand, any other response to the question about LMS usage experience led respondents to skip the presentation and proceed directly to Section 2. The presentation was provided to support this study's hypothesis that there would be no significant differences between the user and non-user groups in their intention to adopt LMS in teaching.

VI. DATA ANALYSIS AND RESULTS

A. Demographics

The participants were almost equal in terms of gender, with 28 (47.46%) males and 31 (52.54%) females. The majority of participants were between 25 and 40 years, with 28.81% from 25 to 30, 37.29% from 31 to 40, 22.03% from 41 to 50, and 10.17% above 50, with a low minority (1.69%) below 25. Saudi-nationality academics recorded the highest response rate, at 54.24%. The rest of the figures and information are presented in Table 6.

B. Experience with LMS

The current study, as previously discussed, investigates the applicability of using TAM on two groups: a user group and a non-user group. As expected, consistent with other figures, almost half of the respondents had not used an LMS (49.15%), while the rest vary in their experience with LMS as follows: Those who had used LMS for less than a year stood at 16.95%; and almost double this number, 28.81%, had used LMS for more than a year but less than 3 years. Only a few respondents had used an LMS for more than three years (3.39% for more than three years and only 1.69% for more than 5 years). In general, the results reveal that 49.15% of respondents were non-users and 50.85% were users. This distribution enables discrimination between the two groups' responses within the study context (Table 4).

TABLE IV.　　Academics experience with LMS

Respondents		Frequency	Percentage
Have not used a learning management system		29	49.15%
experienced users		30	50.15%
Experience in years	Less than a year	10	16.95%
	1–3 years	17	28.81%
	3–5 years	2	3.39%
	More than 5 years	1	1.69%

C. Validity and reliability

In addition to the steps mentioned earlier to assess instruments' validity and reliability, a further test was performed. Reliability assessment was done using Cornbach Alpha[68]. Reliability concerns internal consistency between multiple measurements of variables, and Cornbach Alpha is commonly used to measure it[69].

TABLE V.　　Instruments reliability Cornbach Alpha

Scale	Number of Items	Cronbach Alpha
Perceived ease of use (PEU)	7	0.901
Perceived usefulness (PU)	6	0.924
Attitude towards use (ATU)	3	0.916
Behavioural intention to use (BIU)	2	0.801
Job relevance (JR)	2	0.924
Overall reliability	20	0.958

As per many studies (i.e.,[70, 71], constructs are considered to have internal consistency reliability when the Cronbach Alpha value exceeds 0.07.

In this study, the reliability assessment was done using Statistical Package for Social Sciences (SPSS) version 21. All measures in this study show a high level of reliability, ranging from 0.901 to 0.924, with a satisfactory value of 0.801 for behavioural intention to use. All scales exceeded 0.70, and therefore the survey is considered reliable.

D. Statistical analysis and hypotheses testing

In line with the study objective, correlation analysis was conducted to examine the relationship between the variables used within this study, and therefore to empirically decide whether or not to accept or reject the null hypotheses. The structure of hypothesis testing is as follows. First, hypotheses were tested based on the size of the whole sample. Second, the study investigated the role of prior experience, and therefore hypotheses were tested on the non-user group. Finally, the user-group sample was used for testing the hypothesis. The aim is to provide a comprehensive correlation analysis and then investigate the impact role of prior experience on the correlation significance.

TABLE VI.　　Respondents' demographic information

Respondents	Frequency	Percentage
***Experience in Higher Education* in years**		
< 1	2	3.39
> 2 < 3	19	32.20
> 3 < 5	15	25.42
> 5 < 10	7	11.86
> 10	16	27.12
***Experience at Shaqra University* in years**		
< 1	6	10.17
> 2 < 3	22	37.29
> 3	31	52.54
Academic Rank		
Associate Professor	10	16.95
Assistant Professor	17	28.81
Lecturer	16	27.12
Instructor	16	27.12
Administrative Work		
Vice-rector or deputy vice-chancellor	1	1.69
Associate dean	6	10.17
Department chairman	11	18.64
Centre director	1	1.69
None	31	52.54
Studying in KSA	2	3.39
Studying abroad	7	11.86
Departments		
Computer Sciences & Information Systems	19	32.20
Business Administration & Finance Management	1	1.69
English	10	16.95
Physics	2	3.39
Mathematics	5	8.47
Chemistry	5	8.47
Biology	4	6.78
Pharmacology-related	2	3.39
Islamic Studies	2	3.39
Arabic	5	8.47
Home Economics	2	3.39
Other	2	3.39
Faculty		
Community College	2	3.39
Education Faculty	10	16.95
Arts & Sciences College	35	59.32
Applied Medical Sciences	2	3.39
College of Sciences & Humanities	9	15.25
Faculty of Pharmacy	1	1.69

E. Hypotheses testing for all participants

As stated, this section used the sample size as a whole to test the research hypotheses. Hypotheses on the relationship between TAM original variables are presented first.

1) Hypotheses for TAM variables

a) Perceived ease of use positively affects perceived usefulness of an LMS.

From the correlation analysis result in Table 7, it can be observed that there is a significant positive relationship between the perceived ease of use and perceived usefulness of an LMS. Therefore, H1 is supported.

TABLE VII.   PEOU and PU correlations

Correlations		
Factors		**PU**
	r-value	.576**
PEOU	p-value	.000
	N	59
PEOU: Perceived ease of use; PU: Perceived usefulness		

b) Perceived ease of use positively affects attitudes towards using an LMS.

From the correlation analysis result in Table 8, it can be observed that there is a significant positive relationship between the perceived ease of use and attitude towards usage. Therefore, H2 is supported.

TABLE VIII.   PEOU and ATU correlations

Correlations		
Factors		**ATU**
	r-value	.513**
PEOU	p-value	.000
	N	59
PEOU: Perceived ease of use; ATU: Attitude towards usage		

c) Perceived usefulness positively affects attitudes towards using an LMS.

From the correlation analysis result in Table 9, it can be observed that there is a significant positive relationship between the perceived usefulness and attitude towards usage. In fact, the relationship between perceived usefulness and attitude towards usage indicates a stronger relationship than the relationship between perceived ease of use and attitude towards usage. In general, H3 is supported.

Table 9. PU and ATU correlations
TABLE IX.   PU and ATU correlations

Correlations		
Factors		**ATU**
	r-value	.691**
PU	p-value	.000
	N	59
PEOU: Perceived ease of use; ATU: Attitude towards usage		

d) Perceived usefulness positively affects intention to use LMS.

From the correlation analysis result in Table 10, it can be observed that there is a significant positive relationship between the perceived usefulness and behavioural intention to use an LMS. Surprisingly, the relationship between perceived usefulness and behavioural intention to use does indicate a strong correlation. However, H4 is supported.

TABLE X.   PEOU and BIU correlations

Correlations		
Factors		**BIU**
	r-value	.481**
PU	p-value	.000
	N	59
PEOU: Perceived ease of use; BIU: Behavioural intention to use		

e) Attitude towards using positively affects behavioural intention to use an LMS.

From the correlation analysis result in Table 11, it can be observed that there is a positive relationship between the attitude towards usage and behavioural intention to use an LMS.

However, the relationship does not seem to be significant, and the correlation is not strong. Statistically, H5 is supported.

TABLE XI.   ATU and BIU correlations

Correlations		
Factors		**BIU**
	r-value	.265*
ATU	p-value	.043
	N	59
ATU: Attitude towards usage; BIU: Behavioural intention to use		

f) Perceived ease of use positively affects intention to use an LMS.

From the correlation analysis result in Table 12, a significant positive relationship between perceived ease of use and behavioural intention to use can be observed. Therefore, H6 is supported.

TABLE XII.   ATU and BIU correlations

Correlations		
Factors		**BIU**
	r-value	.376**
PEOU	p-value	.003
	N	59
PEOU: Perceived ease of use; BIU: Behavioural intention to use		

2) The role of prior experience hypotheses

The current study introduced LMS usage experience as a new moderator believed to affect the original TAM constructs. The users were categorized into two groups based on their previous experience using an LMS. Users who had used, or had been using, an LMS were called the user group. The inexperienced users, named the non-user group, were those who had not utilised an LMS before. The related hypotheses were:

a) LMS usage experience negatively influences the non-user group's intention to use an LMS.

b) LMS usage experience negatively influences the non-user group's perceived ease of use of an LMS.

c) LMS usage experience negatively influences the non-user group's perceived usefulness of an LMS.

TABLE XIII. The role of prior experience correlations

Correlations			PU	BIU	JR
The role of prior experience			*PU*	*BIU*	*JR*
	PEOU	r-value	.606**	.476**	.665**
		p-value	.001	.009	.001
		N	29	29	29
Non-user group	*PU*	r-value		.670**	.863**
		p-value		.001	.001
		N		29	29
	BIU	r-value			.720**
		p-value			.001
		N			29
	PEU	r-value	.492**	.247	.495**
		p-value	.006	.188	.005
		N	30	30	30
User group	*PU*	r-value		.226	.627**
		p-value		.229	.001
		N		30	30
	BIU	r-value			.172
		p-value			.363
		N			30

As shown in Table 13, there is a positive correlation between TAM variables for both groups, and it is statistically significant in most cases. Interestingly, a stronger correlation between TAM variables occurred for the non-user group. For instance, when comparing the effect of perceived ease of use on behavioural intention to use an LMS, the non-user group showed a significantly stronger and positive correlation. However, with the user group, the correlation was not statically significant. Consequently, it can be concluded that H7 is not supported.

The correlation between the two main constructs—perceived ease of use and perceived usefulness—indicates a significant positive relationship with other variables. In fact, the non-user group shows a higher correlation. In general, both H8 and H9 are not supported.

3) The role of the job-relevance hypotheses

Job relevance was hypothesised to have a positive impact on both perceived ease of use and perceived usefulness, as follows.

a) Job relevance positively affects the perceived usefulness of an LMS.

Job relevance correlates strongly with perceived usefulness. Further, there is a significant positive relationship between the two variables. Therefore, H10 is supported (Table 14).

TABLE XIV. JR and PU correlation

Correlations		
Factors		*PU*
	r-value	.769
JR	p-value	.001
	N	59

JR: Job relevance; PU: Perceived usefulness

b) Job relevance positively affects the perceived ease of use of an LMS.

Job relevance correlates moderately with perceived ease of use. Similar to the correlation for H10, there is a significant positive relationship between the two variables. Therefore, H11 is supported (Table 15).

TABLE XV. JR and PEOU correlation

Correlations		
Factors		*PEOU*
	r-value	.592
JR	p-value	.001
	N	59

JR: Job relevance; PU: Perceived usefulness

4) The role of the lack of LMS availability hypotheses

It is hypothesized that the lack of LMS availability would positively affect the perceived ease of use as follows:

a) Lack of LMS availability positively affects the perceived ease of use.

Surprisingly, the result shows a negative relationship between lack of LMS availability and perceived ease of use. This result indicates that all participants (in both the user and non-user groups) perceived that lack of LMS availability does not affect ease of use. Therefore, H12 is not supported.

TABLE XVI. The Lack of LMS availability with PEOU

Correlations		
Factors		*PEOU*
	r-value	-.294
Lack of LMS availability	p-value	.024
	N	59
PEOU: Perceived ease of use		

The table below summarises the hypothesis after the testing was done.

TABLE XVII.   Hypothesis summary

Hypothesis	Statement	Result
H1	Perceived ease of use positively affects perceived usefulness of an LMS.	Supported
H2	Perceived ease of use positively affects attitudes towards using an LMS.	Supported
H3	Perceived usefulness positively affects attitudes towards using an LMS.	Supported
H4	Perceived usefulness positively affects intention to use an LMS.	Supported
H5	Attitude towards using positively affects intention to use an LMS.	Supported
H6	Perceived ease of use positively affects intention to use an LMS.	Supported
H7	LMS usage experience negatively influences the non-user group's intention to use an LMS.	Not supported
H8	LMS usage experience negatively influences the non-user group's perceived ease of use of an LMS.	Not supported
H9	LMS usage experience negatively influences the non-user group's perceived usefulness of an LMS.	Not supported
H10	Job relevance positively affects the perceived usefulness of an LMS.	supported
H11	Job relevance positively affects the perceived ease of use of an LMS.	supported
H12	Lack of LMS availability negatively affects the perceived ease of use of an LMS.	Not supported

VII.   DISCUSSION

The current study modified TAM mainly to validate the relationship between the TAM core constructs as well as the effects of moderators proposed with this study. Overall, the statistical analysis shows that the findings of the current study are consistent with the original TAM findings[13]. All TAM-related hypotheses within this study were proven to have positive correlations that are statistically significant. In line with other studies[18, 24, 72-75], academics involved in this study showed a positive attitude towards LMS, and they intent to use an LMS in their work. Further, the study indicates that when users' perceived ease of use increases, the perceived usefulness increases accordingly. As expected, when academics perceived LMS as easy to use, they developed a positive attitude towards utilising it. Similarly, the perceived usefulness increased the degree of positivity toward usage, which subsequently affected the behavioural intention to use. Interestingly, the findings vary between the user-group and the non-user group. The results show that the non-user group shows higher intention towards using LMS. While both groups perceived LMS as easy to use, the statistics show that the non-user group perceived LMS as more useful than the other group.

Job relevance, adapted from[22], showed a strong relationship with perceived usefulness. Academics believed that the use of LMS for teaching is relevant to their job and is a useful matter. On the other hand, lack of LMS availability did not affect academics' perceived ease of use. Based on the

presentation provided to them, they believed that LMS would be easy to use.

Gender and academic rank did not correlate significantly with other variables. The findings suggest that gender and academic rank do not reflect a significant correlation with other constructs. However, the effect of age and gender does not fit within the scope of this study objective.

VIII.   CONCLUSION AND IMPLICATIONS

In general, this study modified the original TAM in order to measure academics' behavioural intention to use an LMS. The current study adapts the core constructs used in TAM. Specifically, it validates the relationship between perceived ease of use, perceived usefulness, attitude towards usage, and overall impact on behavioural intention to use. No surprising findings were found regarding the previous constructs. Therefore, this study confirms other empirical evidence and findings based on TAM. Further, the study successfully confirms the applicability of TAM in the Arab world, specifically in Saudi Arabia in higher-education settings.

As suggested by TAM, this study incorporates external variables including lack of LMS availability, job relevance, and experience with LMS usage. First, the unique environment in which data is collected influences the theoretical framework for this study. Subjects' lack of access to LMS during the data collection phase was assumed to exert a moderating effect on the relationship between TAM constructs, specifically the ease of use. However, the findings show that lack of LMS availability does not automatically mean academics believe using an LMS is difficult. The other external variable, job relevance, was also proven to have a strong relationship with TAM constructs. In particular, job relevance within the context of this study positively affected academics' perceived usefulness of an LMS. The role of prior experience with LMS usage was also investigated. The overall results for both experienced and inexperienced users confirm the original TAM findings. Within this study, inexperienced users indicated a higher degree of positivity towards LMS adoption.

The implication of this study can be surmised as follows. First, this study proposed a theatrical framework based on a robust acceptance model (TAM). This framework can be used to predict the behavioural intention to use an IS prior to the actual implementation. Further, the research model is validated with two different groups in the higher-education context. Moreover, this study contributes to the efforts to empirically validate TAM in the Arab world. Most significantly, this study could benefit Shaqra University's management staff in their future plans to adopt e-learning technologies.

A.   Research limitations and future work

This study is not free of limitations. First and most importantly, this study was limited by time. Further, the findings of this study may not be greatly generalised for various reasons. First, the researchers conducted a size power test, and the result suggests that the sample size should be increased, as a higher sample size would help to make the conclusion more general. In addition, the research framework was designed to be used with LMS. Moreover, the focus on individuals was the main theme of this study. Future studies

could focus on general ICT adoption for teaching and learning. Additionally, collecting data from different groups could be affected by the increase of usage and experience of users[22]. Therefore, longitudinal research may be more suitable to better predicting attitude and behaviour, and hence facilitating comprehensive understanding of the relationships between variables. Moreover, other statistical tests such as factor analysis, multiple regressions, and structural equation modelling could be conducted to confirm variables' validity.

REFERENCES

[1] W. H. Dutton and B. D. Loader, Digital academe: new media in higher education and learning: Routledge, 2004.

[2] [D. Radcliffe, "Technological and pedagogical convergence between work-based and campus-based learning," *Educational Technology & Society,* vol. 5, pp. p54-59, 2002.

[3] S. Naidu, *E-learning: A guidebook of principles, procedures and practices*: Commonwealth Educational Media Centre for Asia (CEMCA), 2003.

[4] K. A. Al-Busaidi and H. Al-Shihi, "Instructors' Acceptance of Learning Management Systems: A Theoretical Framework," *Communications of the IBIMA,* vol. 2010, p. 2010, 2010.

[5] M. F. Paulsen, "Experiences with Learning Management Systems in 113 European Institutions," *Educational Technology & Society,* vol. 6, pp. 134-148, 2003.

[6] M. F. Paulsen, "Online Education Systems: Discussion and definition of terms," *NKI Distance Education,* 2002.

[7] N. Cavus and A. a. M. Momani, "Computer aided evaluation of learning management systems," *Procedia - Social and Behavioral Sciences,* vol. 1, pp. 426-430, 2009.

[8] P. Arroway, E. Davenport, G. Xu, and D. Updegrove, "EDUCAUSE core data service fiscal year 2009 summary report," *Boulder, CO: EDUCAUSE,* 2010.

[9] T. Browne, M. Jenkins, and R. Walker, "A longitudinal perspective regarding the use of VLEs by higher education institutions in the United Kingdom," *Interactive Learning Environments,* vol. 14, pp. 177-192, 2006.

[10] M. Robinson and M. Ally, "Transition to e-Learning in a Gulf Arab Country," in *The 2nd Annual Forum on e-Learning Excellence in the Middle East, Dubai, UAE,* 2009.

[11] S. Abdallah and F. Albadri, ICT Acceptance, Investment and Organization: Cultural Practices and Values in the Arab World: IGI Global, 2010.

[12] F. Lasrado, "Attitudes towards e-learning: Exploratory evidence from UAE," in *The 2nd Annual Forum on e-Learning Excellence in the Middle East, Dubai, UAE,* 2009.

[13] F. D. Davis, "Perceived usefulness, perceived ease of use, and user acceptance of information technology," *MIS quarterly,* pp. 319-340, 1989.

[14] A. Mirza, "Is E-Learning Finally Gaining Legitimacy in Saudi Arabia?," *Saudi Computer Journal,* vol. 6, 2007.

[15] H. Al-Khalifa, "JUSUR: The Saudi Learning Management System," the 2nd Annual Forum on e-Learning Excellence in the Middle East, 2009, Dubai, UAE., 2009.

[16] H. B. Hussein, "attitudes of Saudi universities faculty members towards using learning management system (jusur)," *TOJET,* vol. 10, 2011.

[17] M. G. Al-Joudi, "Enhancement of the performance of Taif University staff members in the area of information technology: A training need assessment," presented at the the 2nd international conference of e-learing and distance education: unique learning for next generation 21-24 FEB. 2011. Riyadh.

[18] R. Woods, J. D. Baker, and D. Hopper, "Hybrid structures: Faculty use and perception of web-based courseware as a supplement to face-to-face instruction," *The Internet and Higher Education,* vol. 7, pp. 281-297, 2004.

[19] R. Alebaikan and S. Troudi, "Blended learning in Saudi universities: challenges and perspectives," *Research in Learning Technology,* vol. 18, 2010.

[20] R. Alebaikan and S. Troudi, "Online discussion in blended courses at Saudi Universities," *Procedia - Social and Behavioral Sciences,* vol. 2, pp. 507-514, 2010.

[21] Y. Zhao, K. Pugh, S. Sheldon, and J. Byers, "Conditions for classroom technology innovations," *The Teachers College Record,* vol. 104, pp. 482-515, 2002.

[22] V. Venkatesh, M. G. Morris, G. B. Davis, and F. D. Davis, "User acceptance of information technology: Toward a unified view," *MIS quarterly,* pp. 425-478, 2003.

[23] A. Mulkeen, "What can policy makers do to encourage integration of information and communications technology? Evidence from the Irish school system," *Technology, Pedagogy and Education,* vol. 12, pp. 277-293, 2003.

[24] M. S. Asiri, R. Mahmud, K. Abu-Bakar, and A. F. Ayub, "Factors influencing the use of learning management system in Saudi Arabian Higher Education: A theoretical framework," *Higher Education Studies,* vol. 2, p. p125, 2012.

[25] M. Fishbein and I. Ajzen, Belief, attitude, intention and behavior: An introduction to theory and research, 1975.

[26] R. Hermans, J. Tondeur, J. van Braak, and M. Valcke, "The impact of primary school teachers' educational beliefs on the classroom use of computers," *Computers & Education,* vol. 51, pp. 1499-1509, 2008.

[27] C.-P. Kao and C.-C. Tsai, "Teachers' attitudes toward web-based professional development, with relation to Internet self-efficacy and beliefs about web-based learning," *Computers & Education,* vol. 53, pp. 66-73, 2009.

[28] M. J. Asiri, R. Mahmud, K. A. Bakar, and A. F. M. Ayub, "Role of Attitude in Utilization of Jusur LMS in Saudi Arabian Universities," *Procedia - Social and Behavioral Sciences,* vol. 64, pp. 525-534, 2012.

[29] A. Albalawi and M. Badawi, "Teachers' Perception of E-learning at the University of Tabuk," in *World Conference on E-Learning in Corporate, Government, Healthcare, and Higher Education,* 2008, pp. 2434-2448.

[30] I. Alzahrani, "Evaluate Wiki technology as e-Learning tool from the point view of Al-Baha university students: A pilot study with undergraduate students in both faculties of science and education," in *annual meeting of the Education, Learning, Styles, Individual Differences Network (ELSIN). June,* 2012, pp. 26-28.

[31] R. H. Shroff, C. Deneen, and E. M. Ng, "Analysis of the technology acceptance model in examining students' behavioural intention to use an e-portfolio system," *Australasian Journal of Educational Technology,* vol. 27, pp. 600-618, 2011.

[32] J.-H. Wu, R. D. Tennyson, and T.-L. Hsia, "A study of student satisfaction in a blended e-learning system environment," *Computers & Education,* vol. 55, pp. 155-164, 2010.

[33] J. Zouhair, "Surveying Learners' Attitudes Toward a Saudi E-learning System," *International Journal of Information and Electronics Engineering,* vol. 12, September 2012 2012.

[34] M. Rogers Everett, "Diffusion of innovations," *New York,* 1995.

[35] V. Venkatesh, J. Thong, and X. Xu, "Consumer acceptance and use of information technology: Extending the unified theory of acceptance and use of technology," *MIS quarterly,* vol. 36, pp. 157-178, 2012.

[36] W. H. DeLone and E. R. McLean, "The DeLone and McLean model of information systems Success: A ten-year update," *Journal of management information systems,* vol. 19, pp. 9-30, Spring2003 2003.

[37] J. E. Bailey and S. W. Pearson, "Development of a tool for measuring and analyzing computer user satisfaction," *Management science,* vol. 29, pp. 530-545, 1983.

[38] W. J. Doll and G. Torkzadeh, "The measurement of end-user computing satisfaction," *MIS quarterly,* pp. 259-274, 1988.

[39] Q. Ma and L. Liu, "The technology acceptance model: a meta-analysis of empirical findings," *Journal of Organizational and End User Computing (JOEUC),* vol. 16, pp. 59-72, 2004.

[40] D. Kim and H. Chang, "Key functional characteristics in designing and operating health information websites for user satisfaction: An

application of the extended technology acceptance model," *International Journal of Medical Informatics,* vol. 76, pp. 790-800, 2007.

[41] J.-W. Moon and Y.-G. Kim, "Extending the TAM for a World-Wide-Web context," *Information & Management,* vol. 38, pp. 217-230, 2001.

[42] P. Y. Chau, "An empirical assessment of a modified technology acceptance model," *Journal of management information systems,* vol. 13, pp. 185-204, 1996.

[43] K. Mathieson, "Predicting user intentions: comparing the technology acceptance model with the theory of planned behavior," *Information systems research,* vol. 2, pp. 173-191, 1991.

[44] D. A. Adams, R. R. Nelson, and P. A. Todd, "Perceived usefulness, ease of use, and usage of information technology: a replication," *MIS quarterly,* pp. 227-247, 1992.

[45] S. Al-Gahtani, "The applicability of TAM outside North America: an empirical test in the United Kingdom," *Information Resources Management Journal (IRMJ),* vol. 14, pp. 37-46, 2001.

[46] C.-S. Ong and J.-Y. Lai, "Gender differences in perceptions and relationships among dominants of e-learning acceptance," *Computers in Human Behavior,* vol. 22, pp. 816-829, 2006.

[47] J. C. Roca, C.-M. Chiu, and F. J. Martínez, "Understanding e-learning continuance intention: An extension of the Technology Acceptance Model," *International Journal of Human-Computer Studies,* vol. 64, pp. 683-696, 2006.

[48] S. Psycharis, G. Chalatzoglidis, and M. Kalogiannakis, "STUDENTS'ACCEPTANCE OF A LEARNING MANAGEMENT SYSTEM FOR TEACHING SCIENCES IN SECONDARY EDUCATION," *ICT AND OTHER RESOURCES FOR TEACHING/LEARNING SCIENCE,* p. 70.

[49] F. D. Davis Jr, "A technology acceptance model for empirically testing new end-user information systems: Theory and results," Massachusetts Institute of Technology, 1986.

[50] MOHE. (2013, 2/10/2013). *Ministry of Higher Education: Higher Education Statistics Center (Universities Statistics).* Available: http://www.mohe.gov.sa/en/studyinside/universitiesStatistics/Pages/default.aspx

[51] S. Taylor and P. Todd, "Assessing IT usage: The role of prior experience," *MIS quarterly,* vol. 19, pp. 561-570, 1995.

[52] H.-P. Shih, "Extended technology acceptance model of Internet utilization behavior," *Information & Management,* vol. 41, pp. 719-729, 2004.

[53] S. Y. Park, "An Analysis of the Technology Acceptance Model in Understanding University Students' Behavioral Intention to Use e-Learning," *Educational Technology & Society,* vol. 12, pp. 150-162, 2009.

[54] K.-T. Wong, P. S. C. Goh, and M. K. Rahmat, "Understanding Student Teachers' Behavioural Intention to Use Technology: Technology Acceptance Model (TAM) Validation and Testing," *Online Submission,* vol. 6, pp. 89-104, 2013.

[55] R. A. Sánchez and A. D. Hueros, "Motivational factors that influence the acceptance of Moodle using TAM," *Computers in Human Behavior,* vol. 26, pp. 1632-1640, 2010.

[56] N. Kripanont, "Using Technology Acceptance Model to Investigate Academic Acceptance of the Internet," *Journal of Business Systems, Governance, and Ethics,* vol. 1, pp. 13-28, 2006.

[57] C.-S. Ong, J.-Y. Lai, and Y.-S. Wang, "Factors affecting engineers' acceptance of asynchronous e-learning systems in high-tech companies," *Information & Management,* vol. 41, pp. 795-804, 2004.

[58] R. C. King and M. L. Gribbins, "Internet technology adoption as an organizational event: an exploratory study across industries," in *System Sciences, 2002. HICSS. Proceedings of the 35th Annual Hawaii International Conference on*, 2002, pp. 2683-2692.

[59] V. Venkatesh and F. D. Davis, "A theoretical extension of the technology acceptance model: four longitudinal field studies," *Management science,* vol. 46, pp. 186-204, 2000.

[60] R. Thompson, D. Compeau, and C. Higgins, "Intentions to use information technologies: An integrative model," *Journal of Organizational and End User Computing (JOEUC),* vol. 18, pp. 25-46, 2006.

[61] K. B. Wright, "Researching Internet-based populations: Advantages and disadvantages of online survey research, online questionnaire authoring software packages, and web survey services," *Journal of Computer-Mediated Communication,* vol. 10, pp. 00-00, 2005.

[62] I.-L. Wu, J.-Y. Li, and C.-Y. Fu, "The adoption of mobile healthcare by hospital's professionals: An integrative perspective," *Decision Support Systems,* vol. 51, pp. 587-596, 2011.

[63] [63] U. Sekaran and R. Bougie, *Research Methods for Business: A Skill Building Approach*: John Wiley & Sons, 2010.

[64] W. G. Zikmund, J. C. Carr, and M. Griffin, *Business research methods*: CengageBrain. com, 2012.

[65] R. W. Brislin, "The wording and translation of research instruments," 1986.

[66] A. A. Jemain, A. Al-Omari, and K. Ibrahim, "Multistage median ranked set sampling for estimating the population median," *Journal of Mathematics and Statistics,* vol. 3, p. 58, 2007.

[67] A. J. Rockinson-Szapkiw, A. Knight, and J. M. Tucker, "Prezi: Trading Linear Presentations for Conceptual Learning Experiences in Counselor Education," 2011.

[68] L. J. Cronbach, "Coefficient alpha and the internal structure of tests," *Psychometrika,* vol. 16, pp. 297-334, 1951.

[69] J. Hair, W. Black, B. Babin, R. Anderson, and R. Tatham, "Multivariate Data Analysis: Pearson Education," *New Jersey: Hoboken,* 2006.

[70] J. C. Nunnally, *Psychometric Theory*: New York: McGraw-Hill, 1967.

[71] U. Sekaran, *Research methods for business: A skill building approach*: New York, USA: John Wiley & Sons., 2006.

[72] M. Afshari, K. A. Bakar, W. S. Luan, B. A. Samah, and F. S. Fooi, "Factors affecting teachers' use of information and communication technology," *International Journal of Instruction,* vol. 2, pp. 77-104, 2009.

[73] M. S. Albalawi, "Critical factors related to the implementation of web-based instruction by higher-education faculty at three universities in the Kingdom of Saudi Arabia," The University of West Florida, 2007.

[74] D. M. Ball and Y. Levy, "Emerging Educational Technology: Assessing the Factors that Influence Instructors' Acceptance in Information Systems and Other Classrooms," *Journal of Information Systems Education,* vol. 19, pp. 431-444, 2008.

[75] S. S. Al-Gahtani, G. S. Hubona, and J. Wang, "Information technology (IT) in Saudi Arabia: Culture and the acceptance and use of IT," *Information & Management,* vol. 44, pp. 681-691, 2007.