

Research:6

Factors affecting King Khaled University staff members' attitude towards using e-learning in the light of a Modified Technology Acceptance Model

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Abstract

Recently, specifically with the advancement in Web 2.0 and its interactive tools such as blogs, wikis, discussion boards, RSS, etc., many universities implement e-learning and its enormous services as they enable learners to be active and take the responsibility of their learning. It is obvious that the number of e-learning opportunities provided by higher educational institutes is growing in Saudi Arabia. When an e-learning system with new technologies and services is presented, it needs to be adopted by its users, both staff and students. The acceptance and successful pedagogical use of an e-learning system can be affected by various different factors among which are users' attitudes. The purpose of this study was to examine the factors that affect staff members' attitude towards use of the Blackboard 0.9 Learning Management System, a commercial e-learning system at Dhran Al-Janoub College of Education and College of Science and Arts, King Khaled University (KKU), Saudi Arabia. In this study, Technology Acceptance Model (TAM) was used as an underlying theory in the light of which staff members' attitude towards the use of the Blackboard 0.9 e-learning management system was interpreted. The data was collected from a total of 61 staff members teaching different specializations at Dhahran Al-Janoub College of Education, and College of Science and Arts. The data was analyzed using SEM analysis and SPSS. Results of study showed that perceived usefulness and perceived ease of use were direct antecedents of KKU staff's attitude towards the use of the Blackboard 0.9 where perceived usefulness was the strongest predictor of attitude. On the other hand, subjective norms and facilitative conditions were indirect antecedents of KKU staff's attitude. Their effect was mediated by the effect of perceived usefulness and perceived ease of use respectively. KKU staff's attitude towards the use of e-learning affected their behavioral intention to use it. Besides, KKU staff's behavioral intention was directly and indirectly affected by each of perceived usefulness, perceived ease of use, subjective norms and facilitative conditions. The modified TAM explained 77% of KKU staff's attitude towards using e-learning and 58% of their behavioral intention. Recommendations concerning the development of staff's attitudes towards e-learning use were presented.

Key words: *E-learning – Theory of Reasoned Action - Technology Acceptance Model – attitude towards e-learning use – behavioral intention - perceived usefulness – perceived ease of use – subjective norms – facilitative conditions*

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Introduction

The introduction of technology into the educational system has reshaped both the teaching and the learning processes resulting in the emergence of a new innovation : e-learning; which is an approach for "delivering electronically mediated, well-designed, learner-centered and interactive learning environments to anyone, in any place and at any time by utilizing the Internet and digital technologies" (Olatokun and Mala, 2006: 127). Šumak et al. (2011) explained that e-learning technologies and services stimulate learners to shift from passive to active learners as they participate actively in the on-line learning process. E-learning has different advantages including: (a) expansion of access to education irrespective of location and time; (b) access to remote learning resources; and (c) preparation of the current generation of students for a workplace where ICTs, particularly computers, the Internet and related technologies, are becoming more and more ubiquitous (Olatokun and Mala, 2006: 128). The applications and processes of e-learning include computer-based learning, web-based learning, virtual classrooms and digital collaboration where contents are delivered via the internet, intranet/extranet, audio and /or video tapes, satellite TV and CD-ROM. According to Yuen and Ma (2008), teachers' successful use of technology depends on their attitudes towards it, its usefulness, acceptance and their intention to use it.

An e-learning system is a system which provides services that are necessary for handling all aspects of a course through a web interface. An e-learning system provides both instructors and learners with services such as enrolling in courses, managing course content, communicating synchronously and synchronously through forums, discussion boards, blogs, e-mails, RSS, uploading and downloading of content, participating in content building, collaborative and project work through wikis, submitting assignments, using both teacher and peer assessment, collecting

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and organizing students' grades, checking grades, conducting online questionnaires, quizzes and/ or tests, using tracking tools, and so on.

Higher education institutes are increasingly adopting different learning management systems (LMSs), both open source such as Moodle; and commercial such as the Blackboard, due to their advantages. However, the adoption of e-learning and LMSs do not guarantee their actual use from the part of both staff and students. University administration is faced with a great challenge if staff and/ or students do not have positive attitudes towards the use of e-learning or do not accept the e-learning system and, in turn, do not use it or use it poorly. If staff members and/ or students do not have positive attitudes towards the use of e-learning systems, then exerted efforts and time would be in vain.

Connelly (2007) pinpointed that since applying e-learning as a form of technology innovation requires cost for infrastructure and both staff and learners' training, understanding users' attitudes, long-term usage and acceptance is of utmost importance for determining if e-learning is worth the required investment. Therefore, educational institutions and service providers need to understand the factors that affect their staff and students' attitudes, acceptance and adoption of the new technology. The acceptance and adoption of e-learning from both users, staff and students, are affected by different factors which Šumak et al. (2011) grouped into two main groups: (a) technological (such as availability of the service and its cost), and (b) individual (related to age, gender, experience, etc.). A number of factors, such as ease of use of the system and user's beliefs, perceptions and training have been cited as contributing to user acceptance and effective usage of computer-based information systems (Olatokun and Mala, 2006).

Adoption of e-learning is considered technology adoption. The most common models used for examining users' attitudes, and adoption of technology is the Technology Acceptance Model (TAM) which was suggested by Davis (1989). This model examines the mediating role of perceived ease of use and perceived usefulness in their relation to systems' characteristics (external variables) and the probability of system use (Legris, Ingham, and Colletette, 2003).

Legris, Ingham, and Colletette (2003) explained that the TAM provides a basis with which one traces how external variables influence attitude, and intention to use technology. Two cognitive beliefs are posited by the TAM: perceived usefulness and perceived ease of use. According to the TAM, one's actual use of a technology system is influenced directly or indirectly by the user's behavioral intentions, attitude, perceived usefulness and perceived ease of using the system. The model also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use. Review of literature shows that the TAM was able to account for around 40 % to 50 % of user acceptance of technology.

The TAM2 extended the original model to explain perceived usefulness and usage intentions including social influence (subjective norms, voluntariness, and image), cognitive instrumental processes (job relevance, output quality, and result demonstrability) and experience. The new model was tested in both voluntary and mandatory settings. The results strongly supported the TAM2 and explained 60 % of user adoption of technology (Venkatesh & Davis, 2000 cited in Park, 2009).

Research on attitude towards acceptance and use of e-learning is usually conducted in two areas: empirical validation of the TAM or any other theory or extension of the theoretical model with user specific factors. Results of the studies are inconsistent. Very few studies have adopted the TAM as a model for explaining the use of an e-learning system designed and provided by organizations. It is assumed that the more end users' perceived usefulness and perceived ease of use of the e-learning system, the higher their positive attitudes towards the system, and, the more positive their acceptance and potential future usage of the e-learning system will be.

Problem of the study

With the growing reliance on information systems and increasing rapidity of the introduction of new technologies into learning environment, identifying the critical factors related to user attitude and acceptance of technology continues to be an important issue. Most universities have continued to offer partial, blended, or fully online e-learning courses since late 1990s. At present, most off-line universities have either introduced an e-

learning plan or have implemented e-learning. Despite quantitative growth of e-learning, there is a growing concern that stresses quality assessment for e-learning in higher education. In addition, according to Park (2009), barriers in terms of e-learning utilization in universities or colleges still exist. Developers and deliverers of e-learning need more understanding of staff's and students' attitudes towards adopting and use of e-learning. They also need to know how teaching staff and students perceive and react to elements of e-learning along with how to most effectively apply an e-learning approach to enhance teaching and learning. In addition, knowing staff's and students' attitudes and intentions, and understanding the factors that influence acceptance and adoption of e-learning, can help academic administrators and managers to create mechanisms for attracting more staff and students to adopt this teaching/ learning environment and make use of their potentials. Therefore, it is necessary to conduct research that deals more intensively with end users' attitude towards using e-learning and their usage intention.

However, research in this area focused on students' attitude, acceptance and adoption of e-learning systems. Few studies, to the best of the researcher's knowledge, were concerned with staff/ instructors' attitude, acceptance and adoption of an e-learning system. In addition, in spite of the growing research conducted in the area of staff and students' attitudes, acceptance and adoption of e-learning worldwide, little research has been done in the Arab world. No study was conducted in Kingdom of Saudi Arabia, to the best of the researcher's knowledge, to empirically determine the factors that affect university staff's attitude towards e-learning use such as perceived usefulness, perceived ease of use, intention to use, with social factors such as subjective norms.

King khaled University (KKU), located in Saudi Arabia, is one of the leading universities which adopted the use of e-learning in all its institutions since 2003. KKU uses e-learning at three levels: supportive level which is obligatory to all staff members, blended and complete levels which are optional. The number of students using the e-learning system till the end of 2013 was 35436 out of 49658 (71.36%). The number of staff members using the system was 1593 out of 2011 (79.21%). The number of courses using e-learning was 3139 out of 7152 (43,89%). Number of complete e-courses was 48 and blended courses 341 (KKU site at

<http://elc.kku.edu.sa/node/7/2207>). These numbers reflect the great effort exerted by the Deanship of E-learning at KKU. However, some of these numbers may be misleading since the quantitative approach for analyzing the data does not actually show to what extent the system is activated, not just used, by its users. For example, just posting an announcement from the part of the course instructor is considered activation of the system.

In addition, in spite of the great efforts exerted by the Deanship of E-learning, still, based on the researcher's experience as the coordinator and the e-learning specialist at the College of Education and the College of Science and Arts, Dhahran Al-Janoub, KKU for three years, many staff members are hesitant in using e-learning. Many of them have a negative attitude towards its use favoring face to face teaching. This in turn is reflected on students' attitude towards e-learning use. In addition, little research has been done to investigate factors affecting KKU staff's attitude towards e-learning use and the process of how they accept and adopt e-learning.

Studies recommended that since the TAM is concerned with internal variables contributing to acceptance and adoption of technology systems, studies should try to extend the TAM in order to find out external variables and investigate their effects (Šumak et al. 2011). The TAM is used and modified in this study to analyze internal and external factors that affect KKU staff's attitude towards e-learning use. The TAM was used in this study because it: (a) focuses on information technology which is the focus of this study, (b) is a widely accepted model used by many researchers, (c) is a simple and generic model that can easily be used and adapted to any form of technology, and (d) has been used in the context of learning management systems such as Moodle and the Blackboard 0.9 .

Aims of the study

This study aimed at determining the factors that affect KKU staff members' attitude towards the Blackboard 0.9 e-learning system use. It also aimed at using a modified TAM to find out the causal relationships between some variables based on modified TAM (attitude, perceived usefulness, perceived ease of use, subjective norms, facilitative conditions and behavioral intention) that affect KKU staff's attitude, acceptance and intention to use

the Blackboard 0.9 e-learning system. The third aim of the study was to develop a model of e-learning acceptance of university staff that would provide educators with implications for better implementation of e-learning.

Questions of the study

The study, thus, tried to answer the following questions:

1. What are the factors that directly and indirectly affect staff members' attitudes towards the use of the Blackboard 0.9 e-learning system, at Dhahran Al-Janoub College of Education and College of Science and Arts, KKU, Saudi Arabia in the light of a modified TAM?
2. What are the causal relationships between perceived usefulness, perceived ease of use, behavioral intention, subjective norms, facilitating conditions and attitude towards the use of the Blackboard 0.9 e-learning system?
3. What is the suggested modified TAM model that shows the causal relationship between perceived usefulness, perceived ease of use, behavioral intention, subjective norms, facilitating conditions and attitude towards the use of the Blackboard 0.9 e-learning system?

Review of literature

Technology acceptance and adoption

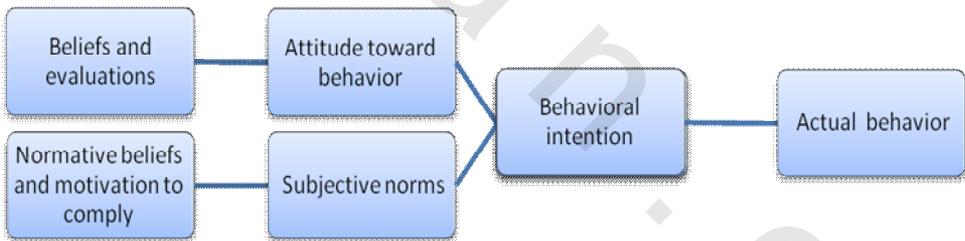
Technology acceptance is the demonstrable willingness within a user group to employ information technology (IT) for the tasks it was designed to support (Dillon and Morris, 1998: 5, cited in Shoroff, Dennon and Ng, 2011). There are many theories that explain how and why users tend to adopt, or not to adopt, a specific technology. Theory of reasoned action (TRA), theory of planned behavior (TPB), unified theory of acceptance and use of technology (UTAUT) and technology acceptance model (TAM) are among them.

Most theories and models of technology acceptance are inspired by TRA as suggested by Fishbein and Ajzen (1975). According to Abdel-Wahab (2008:4-5), TRA model explains and predicts behavioral intentions in many general settings. The model "hypothesizes that a person's behavioral intention to perform (or not to perform) a behavior is determined by that person's attitude

and subjective norms: behavioral intentions are assumed to capture the motivational factors that influence a behavior, and thus indicate how hard people to try or what extent they are planning to make an effort, in order to perform the behavior". According to Chen and Huang (2012), TRA can integrate previous theories on the influence of attitudes on behavior. This theory assumes that behavior can be controlled by an individual's will, which could, thus, be used to predict and explain individual behaviors. However, the theory is usually restricted by many factors that significantly reduce its explanatory power regarding individual behavior.

TRA is the theoretical basis model for the TAM (Davis, Bagozzi and Warsaw, 1989:982). TRA is widely used in social psychology to understand any human behavior, in general (Ajzen and Fishbein, 1980:55). Therefore, it is also appropriate for explaining e-learning usage behavior. According to TRA, performance of any behavior by an individual is determined by his or her behavioral intention. Behavioral intention is signified by the person's attitude towards use and subjective norms together. Figure1 shows these relationships.

Figure 1: Theory of Reasoned Action (Ajzen and Fishbein, 1980:55)



To enhance the predictive power of the TRA, factors related to perceived behavioral control over two dimensions that presumably influence behavioral intentions, namely attitudes toward behavior and subjective norms, were added to form the theory of planned behavior (TPB). The technology acceptance model (TAM), developed by Davis (1989) based on the TRA, provides general explanations about an individual's actual and predicted use of information technology. The TAM has served as a theoretical foundation for investigations into the influences of external variables and users' attitudes on use intentions.

The TAM

The TAM was originally proposed by Davis in 1986. It has proven to be a theoretical model that helps to explain and predict user behavior of information technology (Legris, Ingham, & Colletette, 2003; and Connolly, 2007). The TAM is an extension of TRA. According to Teo (2010), Davis et al. (1989) developed the TAM to address the issue of how users come to accept and use a technology. Two specific variables, perceived usefulness and perceived ease of use, were hypothesized to be fundamental determinants of user acceptance. The TAM uses TRA as a theoretical basis for specifying the causal linkages between perceived usefulness and perceived ease of use and users' attitudes towards use, behavioral intentions and actual technology adoption behavior. Figure 2 shows relationships within the TAM.

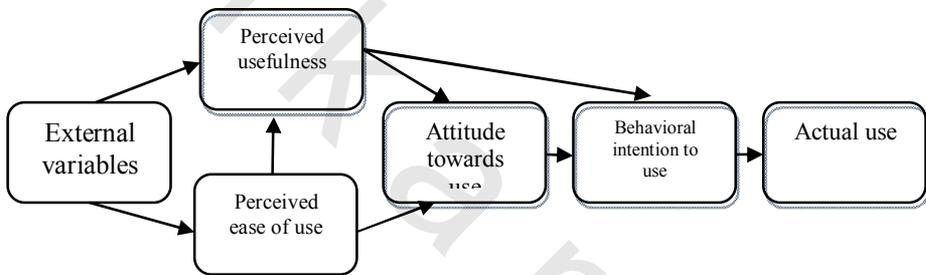


Figure 2: The Technology Acceptance Model (Park, 2009: 151)

As figure 2 shows, perceived usefulness and perceived ease of use are hypothesized to affect users' attitude towards the use of technology, which in turn affects their behavioral intention to use it. The following section presents definitions of each variable in the TAM.

Perceived usefulness: The first belief, perceived usefulness (PU) "is the perception that a given technology will help a user achieve his or her work goals" (Wallis, 2008: 15). It also refers to the degree to which an individual believes that a particular system would enhance job performance within an organizational context. According to Teo (2010), the extent to which a person uses or does not use an application or a system is associated with the belief that it will enhance job performance. This may include doing the job quickly, accurately and efficiently.

Perceived ease of use: Perceived ease of use (PEOU), the second key belief, is the degree to which an individual believes that using a particular system would be free of effort (Wallis, 2008). While users may believe that an application is useful, they may still believe that it is difficult to use. The TAM indicates that system usage is indirectly affected by both PEU and PU.

Attitude towards usage: Attitude towards use (ATU) is referred to as the evaluative effect of positive or negative feeling of individuals in performing a particular behavior (Ajzen and Fishbein, 2000). Attitude towards use has been identified as a factor that guides future behavior or the cause of intention that ultimately leads to a particular behavior.

Behavioral intention: The dependent variable behavioral intention (BI) refers to the degree to which a person has formulated conscious plans to perform or not perform some specified future behavior (Šumak et al., 2011: 92).

Since 1995 many studies have been conducted to extend the TAM by adding external variables into the model. The external variables may be selected according to the context. Accordingly, the TAM was extended to the TAM 2 to include subjective norms (SNs) and facilitating conditions (FCs) as determinants of intent, where SNs refer to the perception of pressure to participate in an action as a result of the influence of other people (Wallis, 2008: 10) . In other words, SNs refer to a person's perception that most people who are important to him/her think he/she should or should not perform the behavior in question. In the context of KKU, the people that staff members may consider important may be the university administration, the Deanship of E-learning and the college administration. FCs refer to factors that are present in the environment that exert an influence over a person's desire to perform a task. Factors such as skills training, availability of computers and access to the internet, administration support and cost are examples of FCs (Connolly, 2007:3).

There have been a great number of studies on the TAM in different contexts such as information technology and information systems. Recently, the use of the TAM in educational settings started to emerge. Some studies investigated the different variables that directly affect or mediate students' attitude,

intention to use and/ or actual usage of technology systems. Olatokun and Mala (2006) assessed 400 undergraduate and postgraduate students' satisfaction with e-learning at the National Open University in Nigeria to determine the factors that influence their intention to use e-learning. Results showed that users' satisfaction had a positive significant relationship and contributed more to students' intention to use e-learning. Furthermore, system quality, and service quality, were significant predictors and contributed more to students' satisfaction with e-learning. A strong relationship was found between students' satisfaction and use of e-learning.

The TAM has been widely used as the theoretical basis for many empirical studies of user technology acceptance and has partially contributed to understanding users' acceptance of information systems (IS)/information technology (IT). Legris, Ingham, and Collette (2003) conducted a meta analysis of empirical studies conducted on the TAM. Results of that study tended to support the view of some researchers who suggest that the TAM should be modified to include other components. Marson (2007) investigated users' (instructors and students) acceptance of e-learning in universities as an effective learning tool and developed a model for e-learning usage based on the TAM. Results of that study validated that PEOU and PU have a significant influence on ATU of e-learning. In addition, PU and ATU explained 39.9% of the variance of usage intentions.

Abdel-Wahab (2008) examined factors that predict 258 business students' intention to adopt e-learning at the Egyptian University of Mansoura using the technology adoption model. Results of that study revealed that five factors: attitudes towards e-learning, PU, PEOU, pressure to use e-learning and the availability of resources contributed to students' intention to use e-learning.

Wallis (2008) examined the validity of predicting social networking systems among 500 Psychology students at the University of South Florida through a modified the TAM. Findings suggested that the modified TAM is a reasonable model of the acceptance of online social networking systems but the SNs component was not predictive of acceptance.

Ku (2009) examined students' acceptance of the World Wide Web Course Tools (WebCT) online learning system using perceived resources and the TAM. Ku also aimed at determining the causal relationships regarding students' acceptance behaviors when using WebCT. indicated the of influence of the model variables on students' acceptance behaviors towards WebCT. Park (2009) used a general model of TAM which included e-learning self-efficacy, SNs, system accessibility, PU, PEOU, ATU, and BI to use e-learning to analyze 628 university students' intention to use e-learning. Results proved the TAM to be a good theoretical tool to understand users' acceptance of e-learning. E-learning self-efficacy was the most important variable, followed by SNs in explicating the causal process in the model.

Another trend of studies used the TAM to investigate factors affecting attitudes and intention to use technology. Liaw, and Huang (2011) examined 424 university students' attitudes towards using the Blackboard 0.9 e-learning system two months after its actual use. They also examined the factors that affected their attitudes. Results of that study revealed that experience in using the computer was a significant predictor of learners' self-efficacy and motivation towards e-learning. Self-efficacy and motivation, both intrinsic and extrinsic, were significant predictors of BI of using e-learning.

Shroff, Deneen and Ng (2011) examined BI to use an e-portfolio assessment, a component of the Blackboard 0.9, using the TAM among 72 students enrolled in Bachelor of Education Programs at the Hong Kong Institute of Education. Results indicated that students' PEOU had a significant influence on ATU. Subsequently, PEOU had the strongest significant influence on PU. That research further demonstrated that individual characteristics and technological factors might have a significant influence on instructors to adopt e-portfolios into their courses. Those results suggested that the TAM is a solid theoretical model where its validity can extend to an e-portfolio context. Shu and Chuang (2011) used the Unified Theory of Acceptance and Use of Technology (UTAUT), a modified version of TAM, to find out wiki users acceptance of the system. Results of that study revealed that performance expectance, effort expectance, FCs and user involvement had a positive effect on the BI to use wikis. Šumak et al. (2011) examined the factors that affected 235 students'

perceptions about the use and acceptance of Moodle - an open source e-learning system, in the light of the TAM. Results of that study revealed that the actual use of Moodle depended on two main factors: BI and ATU of Moodle. PU was found to be the strongest and the most important predictor of ATU of Moodle.

Chen and Huang (2012) explored learners' attitudes towards web-based recommendation learning service system for interdisciplinary applications used by 182 IT university students in Taiwan. Results of that study showed a wide acceptance of the learning service system besides, e- system satisfaction were the most important factors affecting learners' attitudes. Interface satisfaction was the strongest predictor of recommendation accuracy and content satisfaction. Hsu and Chang (2013) used modified TAM to predict college and senior high school students' perceptions about the acceptance and use of Moodle. Results of that study indicated that perceived convenience had a direct effect on PU. PEOU, perceived convenience, and PU had significantly positive impacts on ATU of Moodle. In addition, continuance intention to use Moodle was directly influenced by ATU of Moodle. Sharma and Chandel (2013) identified the main factors that influenced learning through websites among 100 students at Sultan Qaboos University, Oman using the TAM. Results of that study revealed that PU, PEOU, perceived website quality, and computer self-efficacy were critical factors for determining students' attitudes and BI to use learning through websites.

Studies on teachers' acceptance of technology

Some studies focused on investigating instructors'/ teachers' attitudes towards e-learning use, its acceptance and/ or adoption. Al-Gahtany (2001) studied why the TAM would be applicable to test IT adoption and diffusion in Saudi Arabia. Findings confirmed that the TAM constructs are both valid and reliable in Saudi Arabia as one of the countries in the Arab World. Mishra and Panda (2007) developed an empirically- based psychometrically-sound instrument to measure faculty attitude towards e-learning. The developed scale showed high probability of differentiating between positive and negative attitudes towards e-learning. Marson (2007) investigated users' (instructors and students) acceptance of e-learning in universities as an effective learning tool and developed a model for e-learning usage based on the

TAM. Results of that study validated that PEOU and PU have a significant influence on ATU of e-learning. In addition, PU and ATU explained 39.9% of the variance of usage intentions. Mahdizadeh, Biemans and Mulder (2008) identified factors that explain teachers' use of e-learning environments in higher education. A questionnaire was completed by 178 teachers from a wide variety of departments at Wageningen University in the Netherlands. Results of that study revealed that 43% of the total variance in teacher use of e-learning environments could be explained by their opinions about web-based activities and their opinions about computer-assisted learning (predictors) and the perceived added value of e-learning environments (mediating variable). In addition, PEOU and PU can be used to predict teachers' actual use of e-learning environments.

Yuen and Ma (2008) explored a modified version of the TAM to understand acceptance of 152 in-service teachers studying a part-time teacher education program in Hong Kong of e-learning technology. It was found that SNs and computer self-efficacy served as the two significant constructs in the TAM. PEOU was the sole determinant to the prediction of BI to use, while PU was non-significant to the prediction of BI to use e-learning.

Liu (2010) extended the technology acceptance model by adding wiki self-efficacy, online posting anxiety, and perceived behavioral control and empirically tested the new model with wikis. That study found that wiki self-efficacy, PEOU, PU, and wiki use BI had direct and indirect significant impact on wiki usage in the classroom. Teo (2010) examined pre-service teachers' attitudes towards computers. He also extended the TAM by adding SNs, FCs, and technological complexity as external variables. Results of that study showed that the TAM and SNs, FCs, and technological complexity were significant determinants of pre-service teachers' ATU of computers. A multiple square correlation revealed that the proposed model in this study explained 48.7% of the ATU of computers.

Holden and Rada (2011) extended the TAM to incorporate teachers' perceived usability and self-efficacy measures toward the technologies they are currently using in rural school districts in Virginia . Results of that study showed that the incorporation of perceived usability into the TAM explained more variance and was

more influential to the TAM elements. Lee, Hsieh and Hsu (2011) investigated factors affecting 552 participants' behavioral intentions to use e-learning using an integrative model that combines both the TAM and the Innovation Diffusion Theory.

Gu, Zhu and Gue (2013) aimed at investigating the factors that affected students and teachers' acceptance of technology in the light of the TAM and understanding the difference between them. Results indicated that personal factors were the most important for both students and teachers. Self-efficiency and ICT were the most important factors in ICT adoption. Social norms also had a significant effect on both users. Teo (2014) explored the key determinants of pre-service teachers' e-learning satisfaction using a modified version of the TAM. The results of that study showed that, apart from FCs, all constructs were significant predictors of e-learning satisfaction. However, the FCs construct was found to be a significant mediator of PEOU and satisfaction.

The model and research hypotheses

Based on review of literature and related studies which showed the direct and indirect relationships between the variables that affect users' attitude, acceptance and adoption of e-learning, the following hypotheses were formulated.

1. Staff members' ATU of the Blackboard 0.9 e-learning management system will be significantly affected by their perception of its PEOU.
2. Staff members' ATU of the Blackboard 0.9 e-learning management system will be significantly affected by their of SNs.
3. Staff members' ATU of the Blackboard 0.9 e-learning management system will be significantly affected by their PU.
4. Staff members' ATU of the Blackboard 0.9 e-learning management system will be significantly affected by their perception of FCs.
5. BI to use the Blackboard 0.9 e-learning management system will be significantly affected by staff members' ATU.
6. BI to use the Blackboard 0.9 e-learning management system will be significantly affected by staff members' PU.

7. BI to use the Blackboard 0.9 e-learning management system will be significantly affected by staff members' PEOU.
8. BI to use the Blackboard 0.9 e-learning management system will be significantly affected by staff members' FCs.
9. BI to use the Blackboard 0.9 e-learning management system will be significantly affected by staff members' SNs.
10. Staff members' PU of the Blackboard 0.9 e-learning management system will be significantly be affected by their perception of SNs.
11. Staff members' PEOU of the Blackboard 0.9 e-learning management system will be significantly be affected by the FCs available for them.

Based on these hypotheses, the research model is proposed as shown in Figure 3. This model hypothesizes that the staff members' ATU of the Blackboard 0.9 e-leaing system may be predicted and explained by their PU and PEOU, in conjunction with SNs, and FCs. The model also hypothesizes that staff's ATU will directly affect their BI to use e-learning.

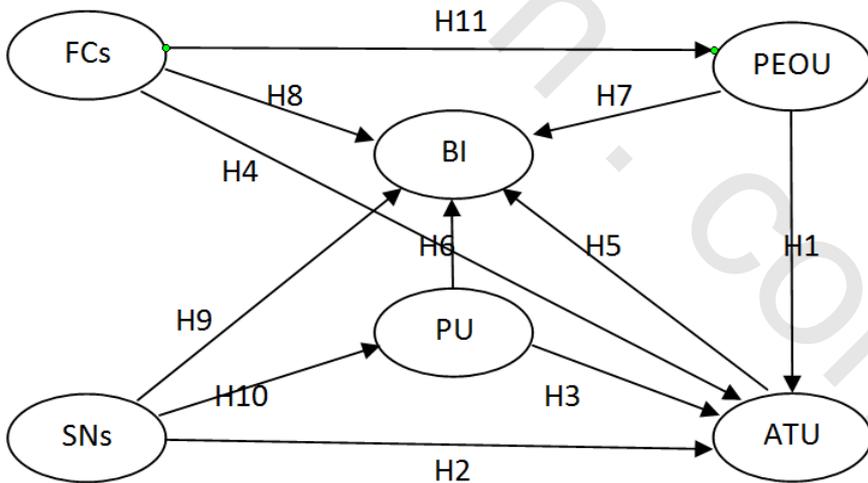


Figure 3: The proposed research model

Method

Participants

All staff members working for KKU at Dhahran Al-Janoub College of Education and College of Science and Arts during the academic year 2013/ 2014 (n=61) volunteered to participate in the study. However, only 56 completed answering the scale. Participants belonged to different nationalities: Saudis, Egyptians, Hindi, Syrian, Sudanese and Bangladeshi. Table 1 presents data on the demographic and background information of the participants.

Table 1: Demographic and background information of the participants

		Frequency	Percentage
Gender	Male	8	14.29%
	Female	48	85.71%
Age	20-30	14	25.00%
	30-40	16	28.57%
	40-50	23	41.07%
	> 50	3	5.35%
Experience in teaching	1-5 years	19	33.92%
	5-10 years	13	23.21%
	10-15	10	17.85%
	>15	14	25.00%
Specialization	Literary	34	60.71%
	Scientific	22	39.28%
Frequency of using the Blackboard 0.9 LMS	<3 hours a week	22	39.28%
	3-6 hours a week	25	44.64%
	6-10 hours a week	3	5.35%
	>10 hours a week	6	10.71%
Training in the area of e-learning	< 3 training courses	35	62.50%
	3-6 training courses	16	28.57%
	>6 training courses	15	26.78%

Instrument of the study

To achieve the purpose of the study, a Scale of Staff Members' Attitude and Acceptance of E-learning was designed by the researcher based on the TAM proposed by Devis (1989). The first section of the scale included demographic information concerning gender, age, experience in teaching, specialization, number of hours spent using the Blackboard weekly and training in the area of e-learning. Components of the TAM: PU, PEOU, ATU and BI were adopted in this study and adapted to suit the Blackboard 0.9 e-learning management system. In addition, the variables SNs and FCs were added in the light of Theory of Reasoned Action

since the researcher believes that they are of great importance in the Saudi context. The rationale of modifying the TAM by adding SNs was that a great number of senior and junior staff at KKU were non Saudi. For them, KKU administration who pinpointed the importance of adopting e-learning served as a reference against which a person judged the importance of performing well in e-learning. Since KKU did its best to make FCs (such as enough computers and lap tops, access to the internet in all rooms in the campus, an e-learning lab with an access to the internet, face-to-face and online training courses on e-learning, and technical support from the e-learning coordinator and deanship of e-learning) available for the staff members and the students, this variable might affect their attitude. Therefore, it was also added.

Variables believed to affect staff members' acceptance and adoption of the Blackboard 0.9 e-learning management system were identified; then, the items measuring each variable were developed. The scale comprised six variables: BI to use e-learning, PU, PEOU, SNs, FCs, and attitude towards e-learning (ATU).

The scale in its first form consisted on 30 items. It was submitted to 6 assistant professors in the college of Education at Dhahran Aljanoub, KKU for face validity. Changes in phrasing some statements were made in the light of the jury members' opinions and suggestions. In addition, the number of items was reduced to 27 in the light of their opinions.

All variables were measured on five-point Likert-type scales, from 1 indicating strongly disagree to 5 indicating strongly agree. Table 2 gives information on the items of the scale.

Table 2 : Description of the items of the Scale of Staff Members' Attitude and Acceptance of E-learning

Variable	Items measuring the variable	Number of items
BI	1-4	4
PU	5-8	4
PEOU	9-12	4
SN	13-17	5
FC	18-23	6
ATU	24-27	4

Statistical Package for Social Sciences (SPSS) was used for estimating validity and reliability. Alpha Kronback coefficient, which is used for estimating the extent to which multiple indicators

for a latent variable belong together, was estimated for the different variables of the scale. The following table presents data on this respect.

Table 3 : Alpha Kronback coefficient for the variables of the Scale of Staff Members' Attitude and Acceptance of E-learning

Variable	Alpha coefficient
BI	0.88
PU	0.92
PEOU	0.88
SN	0.70
FC	0.85
ATU	0.83

Table 3 shows that Alpha Kronback coefficients ranged from 0.70 to 0.92 which shows high level of scale reliability.

In addition, Pearson correlations were used to estimate internal consistency of the items as well as the variables of the scale. Table 4 presents data concerning internal consistency of the items of the scale. The following is the correlation between the items and the variable to which they belong.

Table 4: Internal consistency of the items of the Scale of Staff Members' Attitude towards using E-learning

		Item 1	Item 2	Item 3	Item 4	Total	
BI	Item 1	-	.356	.466	.569	.659	
	Item 2		-	.885	.765	.898	
	Item 3			-	.757	.925	
	Item 4				-	.916	
PU		Item 5	Item 6	Item 7	Item 8	Total	
	Item 5	-	.800	.785	.655	.911	
	Item 6		-	.806	.796	.939	
	Item 7			-	.697	.913	
	Item 8				-	.851	
	Total					-	
EOU		Item 9	Item 10	Item 11	Item 12	Total	
	Item 9	-	.407	.468	.529	.696	
	Item 10		-	.858	.753	.887	
	Item 11			-	.840	.925	
	Item 12				-	.913	
	Total					-	
SN		Item 13	Item 14	Item 15	Item 16	Item 17	Total
	Item 13	-	.319	-.389	-.448	-.980	.531
	Item 14		-	.432	.335	.491	.563

	Item 15			-	.336	.417	.626	
	Item 16				-	.401	.681	
	Item 17					-	.709	
	Total						-	
FCs		Item 18	Item 19	Item 20	Item 21	Item 22	Item 23	Total
	Item 18	-	.437	.50	.438	.422	.50	.651
	Item 19		-	.666	.329	.440	.419	.639
	Item 20			-	.424	.417	.533	.725
	Item 21				-	.438	.303	.728
	Item 22					-	.411	.534
	Item 23						-	.543
	Total							-
ATU		Item 24	Item 25	Item 26	Item 27	Total		
	Item 24	-	.788	.611	.646	.924		
	Item 25		-	.465	.529	.847		
	Item 26			-	.430	.754		
	Item 27				-	.783		
	Total					-		

Table 4 shows that Pearson's correlation coefficients ranged from moderate to high. It is worth noting that almost all of the correlation coefficients between the variable items and the total score of the variable were high. This shows good internal consistency of the scale items.

To estimate consistency of the variables to each other, Pearson correlations were used. Table 5 presents correlation coefficients of the variables to each other.

Table 5: Pearson correlation coefficients of the scale variables

	BI	PU	PEOU	SN	FC	ATU	Total
BI	-	.720	.459	.429	.540	.732	.672
PU		-	.463	.701	.312	.846	.873
PEOU			-	.342	.563	.342	.533
SN				-	.379	.669	.776
FC					-	.405	.656
ATU						-	.902
Total							-

Tables 5 shows that Pearson's correlation coefficients ranged from moderate to high. This shows good internal consistency of the scale variables.

Statistical analysis

To achieve aims of the study, LISREL8.8 was used for statistical analysis. Structure Equation Measurement Analysis (SEM Analysis) was used to test the fit of the proposed theoretical

model with the empirical data gained from the participants. Model Generating Situation was used to generate a model that shows the causal relationships between the different variables of the model. In this case the data was used to generate more than one model and estimate its validity and reliability in order to reach a model that best fit this data (Hassan, 2008). After the final measurement model passed the goodness-of-fit tests, the structural part of the research model was estimated using SEM analysis on the structural model. The structural model was also tested for a data fit with appropriate goodness-of-fit indices. Path analysis was then used to verify the causal relationships between the scale variables.

Data analysis and results

The measurement model

The proposed model examined the effect of the following relationships:

1. The effect of PEOU, PU, SNs and FCs on ATU of the Blackboard 0.9 e-learning management system among staff members at KKU.
2. The effect of PEOU, ATU, PU, SNs and FCs on BI to use the Blackboard 0.9 e-learning management system among staff members at KKU.
3. The effect of SNs on PU of the Blackboard 0.9 e-learning management system among staff members at KKU.
4. The effect of FCs on PEOU of the Blackboard 0.9 e-learning management system among staff members at KKU.

Table 6 summarizes the direct, indirect and total effects included in the causal path analysis model.

Based on the generated model of technology acceptance and results presented in Table 6, the following path equations can be formulated. It is worth-noting that these equations are based on the direct causal effects only.

1. Attitude towards e-learning = +0.63(perceived usefulness) + 0.22(ease of use) + 0.15(subjective norms).
2. Behavioral intention to use e-learning = 0.50 (attitude towards e-learning) + 0.20 (perceived usefulness) + 0.12 (ease of use) + 0.02 (subjective norms) + 0.08 (conditions).
3. Perceived usefulness = 0.74(subjective norms).

4. Ease of use = +0.73(facilitating conditions).

The sum of squares of multiple correlation coefficient (R^2), which showed the explanatory power of the variable, for the previous four equations was .77, .58, .54, and .53 respectively. The sums of squares were high indicating high coefficient of determination reflecting high level of practical significance of the described structure in the four equations. The value of these equations lies in that they are predictive. A variable might be predicted through other variables/ another variable.

From the first equation, it can be concluded that overall explanatory power (R^2) of the model was 77%, which was higher than many other reviewed models used to analyze variables related to technology acceptance and usage.

The structural model

Based on findings of the statistical analysis that showed the direct, indirect and total relationships between the different variables that affect staff members' attitude towards use and adoption of the Blackboard 0.9 e-learning system, many models were generated to select the model that best fit the data using SEM analysis. Many models were experimented based on the data till a model that best fit these data was reached. The model is a causal model since it showed the causal relationships between the variables and identifies the affecting and affected variables. Figure 4 shows the suggested structural model.

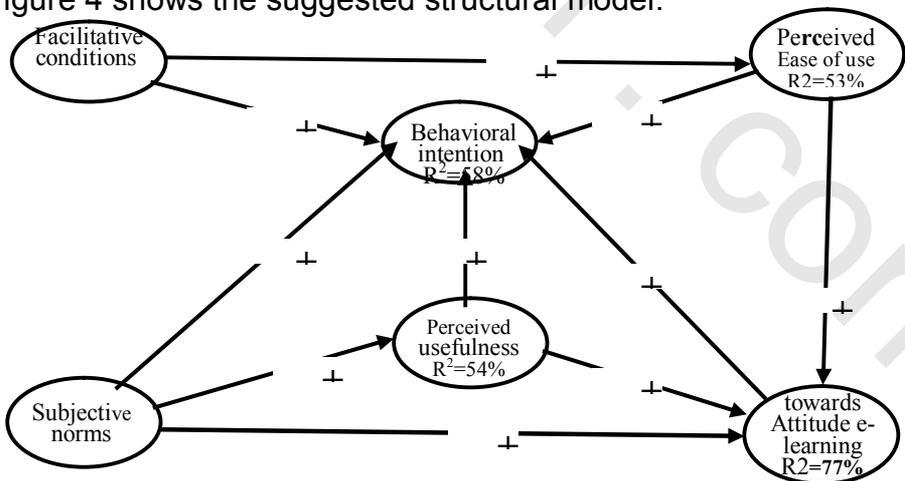


Figure 4: The structural modified model of e-learning acceptance

that the model was valid in showing the causal relationships between the variables that formed the suggested structural model. They also show that the model was valid in predicting a variable through other variables.

Results and interpretation :

Factors affecting KKU staff's attitude towards e-learning use

Results of the statistical analysis revealed that KKU staff's attitude towards e-learning use is determined by their PEOU, PU, SNs and FCs. The effect of the different variables will be discussed in the light of the hypotheses results.

Hypotheses testing results:

Results of the final structural model (see Figure 4) provide support for all hypotheses of the study except for the seventh one which stated that "BI to use the Blackboard 0.9 e-learning system will be significantly affected by staff members' PEOU". The direct (0.12) , indirect (0.10) and total (0.22) effects of PEOU on behavioral intention to use e-learning among KKU staff members were not statistically significant. This may be justified as follows: When staff members have positive attitudes towards using e-learning due to the different variables that interpret it such as FCs, PU and SNs, they will have the intention to use it regardless of its difficulty of use. Staff can sacrifice the time and effort exerted in using the Blackboard 0.9 e-learning system for the sake of FCs, PU and SNs. In other words, the effect of these three variables overweighed the effect of PEOU on BI.

However, all the other 10 hypotheses were verified by the statistical analysis of the model. The analysis showed the following results:

There was a statistically significant positive total effect (at 0.01) of PEOU on ATU among KKU staff. This shows that the Blackboard e-learning management system was perceived by KKU staff members as an easy to learn system. This positively affected their attitude towards its use.

A statistically significant positive total indirect effect (at 0.01) of SNs on ATU among KKU staff was found. KKU staff members were influenced by the pressure of university administration to use e-learning. This means that the higher the SNs the better and

higher the ATU of e-learning among KKU staff members. However, this effect is indirect in the sense that this effect was mediated by PU. KKU's belief that using e-learning is important for staff's work enhanced staff's belief that it will affect quality and efficiency of their work (PU) which, in turn, affected ATU. However, the direct effect of SNs on ATU of e-learning is not statistically significant.

There was a statistically significant positive total effect (at 0.01) of PU on ATU among KKU staff. This means that the higher the staff member expects benefits from e-learning in his/ her teaching (exerting less effort, spending less time and producing quality work, etc.), the better and higher their attitude towards e-learning will be.

FCs affected ATU since results revealed a statistically significant positive total indirect effect (at 0.01) of FCs on ATU among KKU staff. This means that the more, and better, the available FCs of using e-learning the better and the higher the ATU of staff. This effect was mediated by the effect PEOU which in turn affected staff ATU of e-learning.

On the other hand, BI was significantly influenced by staff's ATU of the Blackboard 0.9 e-learning system. It also significantly affected each of PEOU, PU, FCs and SNs. There was a statistically significant positive total effect (at 0.05) of ATU on BI of staff members to use the Blackboard 0.9 e-learning system. This means that KKU staff members' attitude towards using the Blackboard 0.9 e-learning management system influenced their intention to use it. When staff members have a positive attitude towards e-learning, they will probably set plans to use it in their future work.

There was a statistically significant positive total indirect effect (at 0.01) of PU on staff members' BI to use the Blackboard 0.9 e-learning system. This indicates that the higher the staff members perceive usefulness from the system in their work (making it easier, faster, more correct, accurate and enjoyable), the higher their BI to use it will be. However, this effect was not direct since it was mediated by the effect of ATU of e-learning which in turn affected staff's intention to use e-learning. This means that when staff members perceive that e-learning use is useful for their work, they will have a positive attitude towards using it which will be

reflected on their intention to use it in the future. The direct effect of PU on BI was not statistically significant.

In addition, there was a statistically significant positive total effect at (0.05) of FCs on BI among KKU staff. This indicates that the more and better the available conditions for using e-learning, the higher staff's BI will be. On the other hand, the direct and indirect effect of FCs on BI were not statistically significant.

There was a statistically significant positive total indirect effect (at 0.01) of SNs on BI among KKU staff. This indicates that the higher the SNs, the feeling that the people who are important to staff members believe that they should use e-learning, the more potential KKU staff will have the intention to use e-learning. This effect was mediated by ATU and PU. The direct effect of SNs on BI was not statistically significant. This means that SNs affected KKU staff members' ATU of the Blackboard 0.9 e-learning system and their PU of the system. Both ATU and PU affected their BI to use the system.

Results of the study also revealed a statistically significant positive total direct effect (at 0.01) of SNs on PU among KKU staff. This suggests that the higher the SNs, the higher PU among KKU staff. Moreover, a statistically significant positive total direct effect (at 0.01) of FCs on PEOU among KKU staff was shown. This indicates that the more and better the available FCs, the easier will staff use e-learning.

The proposed model:

In this study, the addition of the component "SNs" to TAM variables was justifiable since in KKU the use of e-learning represented in the Blackboard 0.9 LMS was considered a must and those using it at any level, supportive, blended or complete, are encouraged and their efforts were appreciated and acknowledged by both college and university. The addition of the variable "FCs" was of great importance since KKU made almost all FCs available for its staff to encourage e-learning adoption and use.

Results of the study indicated that PU, PEOU and SNs explained 77% of the total variance of attitude towards using the Blackboard 0.9 e-learning system. This percentage is high compared to review of literature which showed that TAM justified

from 40 to 45 of the total variance within the model in addition to UTAUT which explained 70% of the total variance. PU was the strongest predictor of attitude towards use (+0.63) followed by PEOU (+ 0.22) and SNs (+ 0.15). Besides, ATU (+0.45) was the strongest determinant of staff's BI to use e-learning followed by PU (0.20), PEOU (+ 0.12), SNs (+ 0.02) and FCs (+ 0.08).

In addition, ATU of e-learning, PU, PEOU, SNs and FCs accounted for 58% of the KKU staff members' BI to use e-learning. PU of the Blackboard 0.9 e-learning system was predicted by 54% of SNs where FCs accounted for 53% of PEOU. It can be concluded that the suggested modified TAM has high predictive ability.

Discussion of results:

This study aimed at identifying the factors that directly and indirectly affect KKU staff's ATU of the Blackboard 0.9 e-learning system and their BI to use it. The study also aimed at investigating the causal relationships between these factors. Results of the study tended to support the TAM.

In agreement with the TAM, PU and PEOU were found to have a significant causal relationship with staff's ATU and BI to use e-learning. The results of the study indicated that PU and PEOU were the most important determinants of ATU of the Blackboard 0.9 e-learning system. This result is consistent with results of the studies on students' attitudes and intention to use technology (Abdel-Wahab, 2008; Ku, 2009; Shroff, Deneen and Ng, 2011; Šumak et al. , 2011) and those on instructors' attitudes and intention to use technology (Sharma and Chandel, 2013; Hsu and Chang, 2013; Marson, 2007; Liu (2010), Teo (2010), and Teo (2014). This result is contrary to Mahdizadeh, Biemans and Mulder (2008) who found that teachers' use of e-learning environments could be explained by their opinions about web-based activities and their opinions about computer-assisted learning and the perceived added value of e-learning environments. Results are also contrary to Yuen and Ma (2008) and Gu, Zhu and Gue (2013) where SNs, self-efficacy and ICT were the most significant variable explaining users' acceptance of e-learning. Meanwhile, PU and PEOU had a less influential effect.

ATU of e-learning use was discovered to mediate the effect of both PU and PEOU on BI to use e-learning. In addition, both SNs and FCs had an indirect effect on staff's ATU of e-learning. While the former mediated staff's PEOU and ATU, the latter mediated PU and ATU.

Besides, PU, PEOU, FCs and SNs were determinants of BI which was directly affected by ATU. This result has some implications for teaching. First, universities should find ways of enhancing staff's feelings of system usefulness. Training newly appointed staff members and old ones is essential for directing and solidifying their perception of the usefulness of the system. Second, considering staff's participation in actual use of the e-learning system in "job performance evaluation" and in promotion to higher jobs would be of great importance in magnifying perceived usefulness of the e-learning system. Some universities started to re-consider staff's efforts in e-learning and engagement in technology use as criteria of staff's promotion to higher positions.

In order to foster staff members' BI to use e-learning, positive perception of its usefulness is crucial. In addition, it is of a great concern to select an easy to learn and use e-learning system to maximize system use. Technical support should be available in different forms, online and offline, direct and indirect, to foster staff's perceptions of system's ease of use. In addition, universities should make FCs for using e-learning available in order to enhance staff's perceptions of ease of using the system.

Furthermore, university should explicitly announce the need for staff's use of e-learning and encourage it in different ways such as selecting (a) the best activator of the e-learning system; (b) the best designer of an e-course; (c) the best user of the interactive e-learning tools such as discussion boards, blogs, wikis, course e-mail, and so on; (d) the instructor with the highest students' satisfaction with the e-learning course; and (e) the instructor with the highest percentage of students' download of course material, and so on. These ideas among others, such as competitions, and financial rewards would enhance staff's perceptions of system usefulness. This would develop staff's attitude towards e-learning use and their intention to use it.

Compared with prior studies on TAM which revealed an explanatory power that ranged from 40% to 50 % of the variance, it can be said that the model suggested in this study is more powerful and have a stronger utility for explaining staff members' attitude formation and development of e-learning usage intention. The model explains 77% of the staff members' ATU of e-learning and 58% of the BI to use it.

Results of this study support results in previous studies that validated the use on the TAM in technology acceptance. Results show that the TAM interprets staff members' ATU of the e-learning systems in the Saudi context. This model may be a contribution to the literature of the TAM since it contributes to the few studies that dealt with the academic educational context in the Arab World which differs considerably from the business organizations ordinarily studied in previous research.

Like models suggested in previous studies, the suggested modified TAM in this study is not a prescriptive one, i.e., it does not provide diagnostic capability of a system's specific flaws. Rather, it serves as an evaluative and predicting system acceptability in the light of which better chances of enhancing ATU and BI to use can be provided.

Conclusion and recommendations:

This study supports the applicability of a modified version of the TAM in the context of the Blackboard 0.9 LMS. Therefore, results of the study contribute to the body of research in the field of users' acceptance of e-learning systems in general and staff members' acceptance in particular. They provide sound explanation of staff's ATU of an e-learning system and their BI to be used it within an academic setting. However, it is difficult to generalize results since the sample of the study was limited to 56 staff members only. There is a need for further research that deals with greater number of participants.

Participants in this study were officially asked from KKU to use the Blackboard 0.9 e-learning system at any of the three levels, supportive, blended or complete. Similar studies would be needed to use the modified TAM with e-learning systems that staff members voluntarily use such as Moodle, Wikispaces or WebCt.

Statistical analysis in this study was limited to modified TAM variables. A study that investigates more internal (such as self-efficacy, self-confidence, experience, etc.) and external factors (such as technology characteristics) would yield more explanation

power to the TAM model. Another study that studies the interaction of demographic variables such as age, gender, background study, specialization and previous experience in using the internet would provide universities more information concerning staff's ATU of e-learning and BI to use it.

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