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## Research Survey on the Factors Influencing Instructors' Acceptance of Blackboard in Higher Education: A Case Study on King Abdulaziz University, Saudi Arabia

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### **Abstract:**

*Learning management systems (LMSs) such as Blackboard have been employed widely in higher education institutions and they are emerging as a useful tool that support learning activities. However, instructor acceptance of LMSs such as Blackboard remains unclear. The aim of this study is to explore the factors that affect instructors' acceptance and use of LMS in the context of higher education. A conceptual model that integrated three well-known theories, namely technology acceptance model (TAM), DeLone and McLean's information system success model, and motivation theory, was developed. This empirical study was conducted using survey distributed to faculty members at King Abdulaziz University in Saudi Arabia. The data gathered from the samples (n=200) were tested using structural equation modeling. The research model provided a comprehensive understanding of the factors that significantly affect instructors' acceptance of Blackboard. The discussions and implications of the study are essential for researchers and decision makers.*

**Keywords:** Learning management system, e-learning, Technology Acceptance Model, DeLone and McLean's information system success model, TAM, King Abdulaziz University, LMS

### **1. Introduction**

The continuous enhancement of information and communication technologies (ICT) have led to key changes in education. Contemporary educational philosophies, which rely on ICTs, adopt more flexible, more open, and more electronically distributed education (Selvi, 2010). Therefore, higher education institutions capitalize on the development or acquisition of Virtual Learning Environments (VLEs) as a web-based platform that offer a wide range of learning management and automated services for higher education providers, ultimately, enhance the learning experience for both learners and instructors. (Berry, 2006).

Higher education institutions around the world have become aware of how VLEs facilitate the adoption of e-learning pedagogies, the support of teaching and learning practices, and the assurance of learning quality. E-learning is growing rapidly by around 35.6% (Sun, Tsai, Finger, Chen, & Yeh, 2008). About 95% of institutions utilize some kind of e-learning (Yuen & Ma, 2008). Regarding Arab World, a survey about e-learning services provided by 26 Arab universities showed that 96% of them adopt LMSs as a learning environment to support providing blended learning programs. Numerous educational institutions are using LMSs as VLEs to facilitate interaction (Alharbi & Drew, 2014). Although the adoption of LMSs has wide range of benefits to the learning process, as well as to the institution itself, some factors should be considered when an institution plans to develop or acquire an LMS. Instructors' acceptance, motivation and intent to adopt LMSs, for instance, determine their attitude toward the LMS and the degree of their current and future usage of the system for educational purposes, which in turn affect the success of LMS's employment, and its influence on the quality of teaching and learning practices.

Reviewing the related literature, one can recognize scarcity in the studies that focus on instructors' technology adoption in education. This lack was identified by other researchers (Scherer, Siddiq, & Tondeur, 2019; Abdullah & Ward, 2016). Instead, the majority of the studies provide more attention to students' acceptance and their attitude toward e-learning/LMSs use. Hence, there is a need to develop a complex model to analyze the relationships between various factors that affects teachers' acceptance and their intentions toward using technologies in educational process (Sánchez-Prieto, Olmos-Migueláñez, & García-Peñalvo, 2016).

Answering the call for research related to e-learning success in blended format (face-to-face and e-learning) (Cidral, Oliveira, Di Felice, & Aparicio, 2018), and motivated by the implantation of the Blackboard LMS at King Abdulaziz University (KAU), the present case study seeks to investigate KAU's faculty's acceptance, motivation and intent for

adopting the Blackboard LMS in the context of a budding blended learning environment, which is informed by a long-standing experience in the field of Distance Education.

Thus, the study aim is to theoretically explain and empirically test a comprehensive model to examine the factors influencing instructors' intention to adopt Blackboard at KAU drafted from technology acceptance model, and extended with constructs from other perspectives as DeLone and McLean's information system success model, and motivation theory.

## 2. E-learning Adoption in Higher Education

Recently, both educational and non-educational organizations are broadly implementing e-learning systems - also known as VLE's- in order to cut down the training time and cost. The application of e-learning programs in universities contributed in facilitating student learning, enhancing instructors' teaching performance and reducing educational costs (Wang & Wang, 2009; Wang, Wang, & Shee, 2007). Despite the considerable organizational investments in e-learning, several educational institutions face difficulties in attaining effective implementation strategies (Motaghian, Hassanzadeh, & Moghadam, 2013; Park, 2009).

In spite of the benefits of e-learning, the desired efficiency won't be achieved if the users fail to utilize its tools. The resistance of new technology will increase the organization loss in term of time, effort, and cost, which implies the failure of achieving the desired outcomes (Al-Emran, Mezhuyev, & Kamaludin, 2018). Thus, the utilization of e-learning systems is dependent on the user's readiness to accept the system (Tarhini, Hone, & Liu, 2014). Therefore, it is essential to educational institutions to recognize the factors that influence the users' acceptance of a specific LMS in advance.

While most of the researches that have been done related to e-learning in higher education focused on LMSs usage, features used within LMSs, and attitudes towards using them e.g. (Alturki & Aldraiweesh, 2016), only a few of the studies have addressed the acceptance to use LMSs as technological tools, especially in the Arab World, there is a lack of such studies and most universities rush to adopt LMSs to satisfy the increasing demand for e-learning services, without researching faculties' opinion and readiness which might lead to unsuccessful implementation. According to (Keramati, Afshari-Mofrad, & Kamrani, 2011), readiness is a critical factor for e-learning successful outcomes.

Moreover, among the studies that tackled users' acceptance, faculty have received a little attention and most of the studies concentrate on learner's acceptance such as: (Al-Fraihat, Joy, & Sinclair, 2020; Alshehri, Rutter, & Smith, 2019; Binyamin, Rutter, & Smith, 2017; Rani, Suradi, & Yusoff, 2014; Selvi, 2010; Park, 2009; Landry, Griffeth, & Hartman, 2006; Poelmans, Wessa, Milis, Bloemen, & Doom, 2008; Sahin & Shelley, 2008; Abdalla, 2007) and many others. A meta-analysis study was conducted to view the most common and effective external factors incorporated to technology acceptance model in the e-learning context has covered 107 papers in ten years period (from 2006 to 2016), among the studies only eight papers were including teachers or instructors while seventy-nine papers focused on students and the rest of the studies (twenty) included employees, nurses, and other user types. This indicates a gap in the literature of e-learning regarding teachers' technology acceptance (Abdullah & Ward, 2016). Furthermore, teacher's enthusiasm and the roles of instructors are central to technology integration and students' motivation as well (Sánchez-Prieto et al., 2016; Selvi, 2010). According to Motaghian et al., (2013), the success of a web-based learning system is determined by the instructors' roles.

Regarding the higher education in Saudi Arabia, a few studies were conducted to investigate users' adoption and acceptance to LMSs (i.e. Blackboard) such as: (Alkhalidi & Abualkishik, 2019; Alshehri et al., 2019; Adeinat & Abdulfattah, 2017; Binyamin et al., 2017; Alharbi & Drew, 2014). These studies covered several universities at different Saudi cities including: King Khalid University, University of Hai'l, Shaqraa University, and KAU. Although these studies had built their models based on well-known related theories as the technology acceptance model (TAM) and the unified theory of acceptance and use of technology (UTAUT), none of the studies have provide a comprehensive model integrating factors related to both human entities (students, teachers) and non-human entities (LMS), additionally most of them were targeting students' behavior and acceptance expect two studies that focused on instructors' adoption (Adeinat & Abdulfattah, 2017; Alharbi & Drew, 2014).

Hence, it is important to pinpoint the various factors that affect instructors' adoption of e-learning tools in order to support usage (Wang & Wang, 2009), and consequently to achieve the full utilization of them, which validate the importance of this study.

## 3. Theoretical Background and Hypothesis Development

By reviewing the literature of information system (IS) research, several theories have been proposed to explain the relationship between the factors that would affect technology acceptance and use. The most popular theories are Theory of Reasoned Action (TRA), Theory of Planned Behavior (TPB), TAM, UTAUT, DeLone and McLean Model of IS Success (D&M), and Diffusion of Innovation. The most common factors that have been studied in these theories are attitude, perception, beliefs and actual system use (Alharbi & Drew, 2014).

The most commonly tested factors for technology acceptance can be categorized mainly into three types: (1) cognitive/behavioral factors: perceived usefulness (PU), perceived ease of use (PEOU), behavioral intention to use (BI), actual system use (SU), (2) social/psychological factors: subjective norms (SN), self-efficacy(SE), and (3) IS factors: system quality (SQ), information quality (IQ), and service quality (SEQ).

Despite its ability to effectively explain and predict some characteristics of IS acceptance, TAM is considered inadequate to clarify the link between an IS and the users' acceptance behaviors and attitude, since it has only two main explanatory factors (PU, PEOU) (Wang & Wang, 2009). Hence, Davis (1989), suggested the inclusion of external factors into TAM to enhance its ability to explain users' technology acceptance. As well, researchers argue that in order to obtain a broader approach to technology acceptance in educational contexts, motivational variables should be considered (Nikou &

Economides, 2017). As suggested by TAM, many researchers included some external variables in addition to TAM main constructs e.g.: (Scherer et al., 2019; Adeinat & Abdulfattah, 2017; Alharbi & Drew, 2014; Motaghian et al., 2013; Wang & Wang, 2009; Poelmans et al., 2008; Yuen & Ma, 2008).

Alharbi & Drew (2014) carried out a study to predict the behavioral intention to use LMSs, utilizing TAM and incorporating three external variables as suggested by TAM (LMS usage experience, job relevance, lack of LMS availability). The overall results for both experienced and inexperienced users support the original TAM findings. Moreover, the findings show that the lack of LMS availability does not imply the believe that using an LMS is difficult. Job relevance, positively affected academics' PU of an LMS. Similarly, Adeinat and Abdulfattah (2017), proposed a model by adding two external factors to generic TAM. Their results confirmed TAM's validity in higher education context at KAU. Moreover, prior project training -the first external factor- for faculty members at KAU positively impacts TAM main constructs (PU, PEOU) while organizational support -the second external factor- affects instructors' acceptance of Blackboard through PEOU and BI.

Wang & Wang, (2009) built an integrated model in order to identify the variables that impacts instructors' adoption of web-based learning systems, utilizing TAM as a core model, and incorporating some IS success factors from the D&M model as external variables in addition to social/psychological variables as SN and SE. The authors concluded that IS factors as SQ, SEQ, and IQ have positive influence on the basic constructs of TAM. Likewise, a study carried out by Motaghian, et.al., (2013), incorporating IS-based and psychological factors besides TAM behavioral factors found that PU, PEOU and SQ all positively influences instructors' intension to use web-based systems.

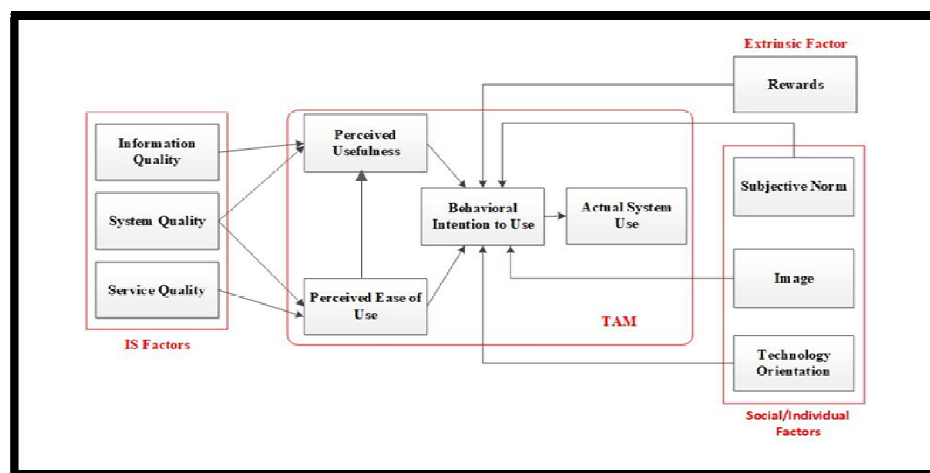


Figure 1: The Study Model

Thus, this study main concern is to identify the factors that influence faculty members' acceptance and use of Blackboard at KAU. Figure 1 shows the research model, which consists of eleven factors representing four main dimensions. The first is user behavior dimension containing four factors based on generic TAM (Davis, 1989): PU, PEOU, BI, SU. The second is the social/ individual dimension that consists of three factors: SN, image (obtained from TAM2) (Venkatesh & Davis, 2000), and technology orientation (Limbu, Jayachandran, & Babin, 2014). The third dimension consists of IS-oriented factors incorporated from the updated IS Success Model of D&M (2003): system quality, information quality and service quality. Lastly, the fourth dimension is the extrinsic motivator, rewards (Cook, Ley, Crawford, & Warner, 2009; Gannon-Cook, 2003).

### 3.1. Technology Acceptance Model

Grounded in the TRA (Ajzen & Fishbein, 1980), TAM has evolved to test user acceptance to information technology. Both PU and PEOU are considered two important determinants (cognitive beliefs) that can affect people acceptance or rejection to information technology. PU implies that individuals tend to use or refuse a technology to the degree they believe it will improve their performance. In this study, PU of a LMSs is defined as the level to which the instructors believe that using an LMS can improve their teaching performance, while PEOU of LMSs is defined as the level in which the instructors believe that using the system is effortless. Thus, the easier the system is to use, the more the user will consider it. The intention to use LMSs is defined the degree to which the instructor is willing to use such systems. Actual System use can be defined as how much a system is really used. TAM clarifies how external variables affects user's attitude and behavioral intentions to use technology. TAM proposes that the effects of external variables on behavioral intention are mediated by TAM key constructs (PU and PEOU) (Davis, 1989).

According to Davis (1989), PEOU had a direct impact on PU, and this was supported by several recent studies such as: (Adeinat & Abdulfattah, 2017; Binyamin et al., 2017; Mohammadi, 2015; Alharbi & Drew, 2014; Park, 2009; Wang & Wang, 2009; Devaraj, Easley, & Crant, 2008; Yuen & Ma, 2008; Halawi & McCarthy, 2007; Masrom, 2007; Venkatesh & Davis, 2000). Additionally, Both PEOU and PU directly affects the intention to use (Davis, 1989; Venkatesh & Davis, 2000). This has been extended to the e-learning context: (Alharbi & Drew, 2014; Tarhini, Hone, & Liu, 2014; Motaghian, et.al., 2013; Devaraj, Easley, & Crant, 2008; Halawi & McCarthy, 2007). Hence, grounded in generic TAM and recent supportive studies the following hypotheses are considered:

- Hypothesis1a: PEOU has a positive impact on the PU of Blackboard.
- Hypothesis1b: PEOU has a positive impact on the instructor's BI to use Blackboard.
- Hypothesis2: PU has a positive impact on the instructor's BI to use Blackboard.
- Regarding the effect of the intention to use a system on usage behavior (how much a system is used), many studies were consistent with TAM and TAM2, and have confirmed the direct positive relationship (Binyamin et al., 2017; Mohammadi, 2015; Tarhini et al., 2014; Motaghian et al., 2013; Wang & Wang, 2009; Devaraj et al., 2008; Venkatesh & Davis, 2000; Davis, 1989).
- Hypothesis4: Instructor's BI to use has a positive effect on his/her actual use of Blackboard.

### 3.2. Social Constructs (External Variables)

Social constructs as SN are considered as external variables since they are related to sources outside of self as social or organizational pressure that can lead a person to perform a specific behavior (Scherer et al., 2019; Sánchez-Prieto et al., 2016). SN is among the most commonly tested external variables in the literature of technology adoption in education (Scherer et al., 2019; Baki, Birgoren, & Aktepe, 2018). SN is defined as 'person's perception that people who are important to him think he should or should not perform the behavior in question' (Fishbein & Ajzen, 1975, p. 302).

In the context of e-learning systems acceptance and use, individuals intend to use them if their attitude toward the use is positive and if they feel that important people to them (supervisors, department heads, colleagues, students) expect them to use such a technology in education. Additionally, SN was incorporated into TAM2 (the expansion of the original TAM) to represent the social influence besides voluntariness and image. SN is included as an effective factor that can directly affects BI in both TRA (Fishbein & Ajzen, 1975) and TAM2 (Venkatesh & Davis, 2000). The direct effect of SN on intention implies that people might decide to perform a specific behavior, although they do not have a personal interest the behavior or its outcomes (Venkatesh & Davis, 2000). Moreover, many studies that tackled e-learning adoption have considered SN either as a direct determinant of intention to use e-learning systems, or indirectly through TAM main constructs (PU, PEOU), or both (Tarhini et al., 2014; Motaghian et al., 2013; Park, 2009; Wang & Wang, 2009; Yuen & Ma, 2008; Chen & Chen, 2006) This leads to the following hypothesis:

- Hypothesis4: Instructor's SN in Blackboard use positively influences his/her BI to use it in teaching/education.

Individuals usually respond to social normative influences to obtain or retain a preferred/desired image within a reference group (Venkatesh & Davis, 2000). Image is defined as 'the degree to which use of an innovation is perceived to enhance one's status in one's social system.' (Moore & Benbasat, 1991, p. 195). TAM2 proposed that SN will positively affect image, and image positively influence PU. The results showed support for both relations (Venkatesh & Davis, 2000). For this study, the following hypothesis is proposed:

- Hypothesis5: Image will have a positive impact on instructor's BI to use Blackboard.

### 3.3. Individual Construct

For this study, technology orientation is defined as the instructors' propensity and skills/ability needed to utilize new technologies or applications in teaching/ education (Limbu, et. al., 2014). Technology orientation is considered as internal factor since it relates to person's capabilities.

Various IS and management research concerned about technology orientation especially for salesmen, since sales technology and the propensity to use ICT has effect on salesperson (Limbu et al., 2014; Eggert & Serdaroglu, 2011). Limbu, et. al., (2014), conducted a study that relates ICT use to job performance, taking into consideration the impact of infrastructure, training and support factors. Technology orientation factor was used to moderate the relationships between each of three factors and job satisfaction. The results showed positive effect of technology orientation as a moderator of some relationships in the case of salesmen with high technology orientation. Assuming that technology orientation factor can affect instructors' use of technology and consequently their performance, as salesmen, the following hypothesis is proposed:

- Hypothesis6: Instructor's technology orientation has a positive effect on his/ her BI to use Blackboard.

### 3.4. Motivation Theory

Building on the basic assumption of the motivation theory, individual proceeds to fulfill higher level needs as the elementary physiological needs are satisfied (Gannon-Cook, 2003). Motivation is known as 'individual's willingness to exert effort to achieve the organization's goals, conditioned by this effort's ability to satisfy individual needs' (DeCenso & Robbins, 1994, p. 327).

Generally speaking, motivation is the main component of the learning environment (Selvi, 2010) and considered to be the most important factor that affect users' acceptance and participation in e-learning. Several studies were conducted to explore whether faculty can be motivated to participate in DE, either intrinsically or extrinsically. Some early studies showed that the intrinsic motivations (i.e. intellectual challenge, ability to reach new audiences) have positively affect participation in DE (Betts, 1998; Schifter, 2000), whereas later studies found out that extrinsic incentives, such as pay increase and royalties are considered to be stronger motivators to participate in DE (Maguire, 2005; Gannon-Cook, 2003). Lately, Researchers suggest the inclusion of extrinsic variables that may affect e-learning acceptance (Baki et al., 2018). Hence, for achieving the purpose of this study, rewards construct was considered.

Extrinsic motivation is defined as 'individual's desire to participate in a given activity for some reason other than the activity itself' (Gannon-Cook, 2003). This refers to doing something because it leads to a valued or favored result (Yoo, Han, & Huang, 2012; Schifter, 2000). Rewards are considered to be an extrinsic motivation which is an important factor in

encouraging individuals to adopt information technology (Yoo et al., 2012). Expected extrinsic rewards are considered as motivations, which imply that individuals are inspired by the personal benefits (Hernandez, Montaner, Ses, & Urquiza, 2011). Devaraj, Easley, & Crant, (2008), suggested to use incentives to target people with tendency to avoid using systems. For the purpose of this study rewards are considered as university administration support and encouragement to faculty members to participate in e-learning programs through monetary reward or other incentives as recognition (acknowledgement of appreciation), release time, and reduced workload (Gannon-Cook, 2003; Schifter, 2000). Hernandez et al. (2011), hypothesized that recognition positively affects attitude toward ICT interactive tools. Based on all what is mentioned above, the following hypothesis is formed:

- Hypothesis7: Rewards have a positive effect on the instructor's BI to use Blackboard in teaching/education.

### 3.5. *Delone and Mclean's Information System Success Model*

Considering that e-learning systems consist of two dimensions, human (i.e. students, teachers), and non-human (LMSs), it is essential to examine the success factors in relevance to both dimensions (Al-Fraihat et al., 2020). Thus, D&M IS success model was adopted in order to highlight the effect of non-human entities related to the Blackboard features. Proposed by DeLone and McLean (1992), D&M IS success model has become one of the most commonly tested models for assessing the success of IS applications. The primary purpose of the original model was to predict and explain system use, user satisfaction, and consequently the impact on individual and organizational performance (DeLone & McLean, 1992). DeLone and McLean (2003), suggested an updated model in response to the remarkable improvements in IS practice, particularly in the context of e-learning and its applications. The updated model consists of six elements: SQ, SEQ, IQ, net benefit, systems use, and user satisfaction (DeLone & McLean, 2003).

For the study purpose, the IQ of an LMS is described as the extent to which the teaching performance is improved due to the use of accurate, reliable, relevant, complete, and timely information obtained through the systems. SQ represents system's performance, technological features, as well as its usability. For LMSs, SQ is viewed as system's efficiency, functionality, and flexibility, that is reflected on instructor's performance by assisting the management of teaching activities (Wang & Wang, 2009; DeLone & McLean, 1992). Lastly, the effectiveness of the overall support, including training and technical support staff efforts, delivered to the instructors in order to assist the use of an LMS (Wang & Wang, 2009; DeLone & McLean, 2003).

However, in e-learning research context, recent studies show that the IS success factors influence the intention to use a system directly (Mohammadi, 2015) and/or mediated by TAM main constructs, PEOU and PU. Four relationships were identified, the first shows that IQ directly affects instructor PU (Wang & Wang, 2009). As the output of a system is helpful, precise, sufficient, and available at the time needed, the instructors are more likely to perceive such a system as a useful one (Motaghian et al., 2013). The second and third directions show direct relationships between SQ and both PU and PEOU respectively (Wang & Wang, 2009) i.e. specific system factors promote system use indirectly. The last relationship proposes the effect of SEQ on PEOU (Motaghian, et.al., 2013; Wang & Wang, 2009). According to Zhao (2007), training enables instructors to use technology creatively to facilitate their work (i.e. the better training effort provided for instructors, the more they find a system easier to use. Likewise, technical support directly relates to PEOU (Ngai, Poon, & Chan, 2007). Additionally, more recent studies validate the essential role of technical support related to Blackboard acceptance and use (Alshehri et al., 2019). Thus, based on the discussion above, the following hypotheses are proposed:

- Hypothesis8: IQ positively impacts the PU of Blackboard.
- Hypothesis9a: SQ positively impacts the PU of Blackboard.
- Hypothesis9b: SQ positively impacts the PEOU of Blackboard.
- Hypothesis10: SEQ positively impacts the PEOU of Blackboard.

## 4. Research Methodology

### 4.1. *Participants*

Faculty members at KAU main campus and branches represent the population of this study. Their total number is 7395 including 3679 males and 3716 females according to the statistics from the Deanship of Graduate Studies (personal communication, September 14, 2015). Based on the Deanship of e-Learning and Distance Education reports, the total number of faculty members who are considered as active users of Blackboard is around 3075 (personal communication, September 10, 2015). The sample size is 200, and it was collected using a simple random method.

Table 1 summarizes the demographic characteristics of the study sample. The majority of respondents were female (77%), while minority were males (23%). In terms of age, percentage indicates that middle-aged instructors represent the majority of the population/sample, while older instructors are minor. Half of the respondents are assistant professors and professor. Blackboard users are dominant by (80.5%) of the respondents, while (19.5%) haven't use blackboard yet and they answered the questionnaire based on their expectation obtained from prior training. Regarding experience, the largest percent of the respondents have used LMSs between 1-3 years (43%), followed by respondents with usage experience that have not exceeded a year (24%) and the ones with experience between 4-6 years (16.5%).

Respondents' Characteristics		Sample Size (n=200)	Percentage
Gender	Female	154	77.0
	Male	46	23.0
Age	36-45	63	31.5
	46-55	57	28.5
	23-35	52	26.0
	56-65	26	13.0
	Over 66 years	2	1.0
	Other		
Job Title	Assistant professor	58	29.0
	Professor	42	21.0
	Lecturer	37	18.5
	Associate professor	33	16.5
	Demonstrator	22	11.0
	Language Instructor	5	2.5
	Other	3	1.5
BB Use/Usage	Yes	161	80.5
	No	39	19.5
LMS Usage Experience	1-3 years	86	43.0
	Less than a year	48	24.0
	4-6 years	33	16.5
	More than 6 years	17	8.5
	Never used it	16	8.0
Level of ability in the use of computers	Advanced	86	43.0
	Intermediate	72	36.0
	Expert	30	15.0
	Beginner	11	5.5
	Don't know how to use computer	1	0.5

Table 1: Descriptive Statistics of Respondents' General Information

#### 4.2. Data Collection

This study targeted faculty members who participated in using Blackboard in either one or more of the academic programs, regular, external and/ or distance education at KAU main campus and branches in Jeddah and Rabigh. The use of Blackboard is mandatory for both external and distance education programs. On the other hand, instructors who are teaching regular students are using Blackboard voluntarily to support face to face learning and enhance communication as a form of blended learning. Initially, 40 questionnaires were distributed, 13 valid responses were received. Soon After, an electronic version of the questionnaire was developed, and a link of the questionnaire was uploaded on Blackboard's home page. Received electronic responses were 187, and all of them were considered valid.

#### 4.3. Measurement Development

Consistent with previous empirical studies in technology acceptance and similar studies in the e-learning context, the current study adopted a quantitative approach to test the proposed model. Study survey was developed based on the study objective and previous literature review, and it was approved by the supervisor. The survey was prepared and written in English and translated into Arabic since most staff at KAU are Arabic native speakers. Both versions of the questionnaire were revised and modified by a bilingual expert to ensure the clearness and appropriateness of each statement; and accordingly, some changes and rephrasing were made. Online surveys were distributed to save time and expenses. Also, they are considered as an appropriate tool to use in order to access both male and female participants easily since Saudi Arabia's system imposes gender-segregation in education.

To ensure content validity and appropriateness, the questionnaire was adapted from the original measurement scales used in TAM (Venkatesh & Davis, 2000) and from other previous studies (Limbu et al., 2014; Wang & Wang, 2009; Pituch & Lee, 2006; Gannon-Cook, 2003), after making the necessary wording adjustment to fit the study purpose.

The survey contained closed-ended questions with predetermined answers to allow respondents to select the answer that is compatible with their opinions, and to save time. Moreover, this type of questions ensures stable responses. The survey is composed of two parts, the first part contained twelve questions related to demographic and general information (gender, age, job title, collage, department, Blackboard use, e-learning/ LMSs experience, academic programs, the level of ability to use computers, as well as place, device and internet connection used to access Blackboard). The second part of the survey was about the possible factors affecting Blackboard usage. This section asked forty questions related to the eleven constructs of the research model which are: PU, PEOU, BI, SU, SN, image, rewards, technology orientation, SQ, SEQ, and IQ.

All the questions of the second part of the questionnaire were answered using a five-point Likert scale with five as 'strongly agree' and one as 'strongly disagree'. The 'Neutral' selection indicates neither agreement nor disagreement.

Constructs	Measurers		Reference
Image (IMG)	IMG1	Instructors in KAU who use BB have more prestige than those who do not.	(Venkatesh & Davis, 2000)
	IMG2	Instructors in KAU who use BB have a high profile.	
	IMG3	Using BB is a status symbol in KAU.	
Technology Orientation (TO)	TO1	I extensively use technology in teaching.	(Limbu et al., 2014; Wang & Wang, 2009)
	TO2	I like to try new technologies only if I have prior experience with similar ones.	
	TO3	I try to link different technologies so they work together well.	
	TO4	Compared to other instructors, I'm technologically oriented.	
	PTE2	I see myself as someone who has an assertive personality.	
Perceived Ease of Use (PEOU)	PEOU1	My interaction with BB is clear and understandable.	(Venkatesh & Davis, 2000; Wang & Wang, 2009)
	PEOU2	Interacting with BB does not require a lot of my mental effort.	
	PEOU3	I find BB to be easy to use.	
	PEOU4	I find it easy to get BB to do what I want it to do corresponding to the ways I teach.	
Perceived Usefulness (PU)	PU1	Using BB improves my teaching performance.	(Venkatesh & Davis, 2000)
	PU2	Using BB in teaching increases my productivity.	
	PU3	Overall, I find BB to be useful in teaching.	
Behavioral Intention to Use (BI)	BI1	I intend to increase my use of BB in the future.	(Wang & Wang, 2009) Self-developed
	BI2	I will start using BB soon (or have started).	
	BI3	I will strongly recommend others to use BB.	
Actual System Use (SU)	SU1	I use BB to communicate with my students.	(Wang & Wang, 2009) Self-developed
	SU2	I use BB to distribute course materials and activities (e.g. content, syllabus, assignments, quizzes, .... etc.) to my students.	
	SU3	I use BB regularly.	
Subjective Norms (SN)	SN1	My department head/supervisor thinks that I should use BB	(Venkatesh & Davis, 2000)
	SN2	My students think that I should use BB	
	SN3	My colleagues think that I should use BB	
Rewards (REW)	REW1	I will use BB only if there is monetary reward for participation.	(Gannon-Cook, 2003) Self-developed
	REW2	I will use BB only if my teaching load is reduced.	
	REW3	Recognition (acknowledgement of appreciation) will highly motivate me to use BB	
Information Quality (IQ)	IQ1	BB can provide me with accurate information.	(Wang & Wang, 2009)
	IQ2	BB can provide me with sufficient information to enable me to do my tasks.	
	IQ3	BB can provide me with helpful information regarding my tasks.	
System Quality (SQ)	SQ1	BB provides assessment tools that can be used easily by the instructor (assignments, quizzes, ...etc.).	(Wang & Wang, 2009; Pituch & Lee, 2006)
	SQ2	BB tools can clearly present course content.	
	SQ3	BB provides effective communication tools (BB Collaborate, Course Message, Discussion Board, Email, Wikis, etc.).	
	SQ4	BB offers flexibility as to time and place of use.	
	SQ5	In general, BB response is fast (e.g. time for upload, download, accessibility).	
	SQ6	BB has well-designed user interfaces.	
Service Quality (SEQ)	SEQ1	Training provided for operating BB is sufficient.	(Wang & Wang, 2009)
	SEQ2	BB training enhances my ability to use the system.	
	SEQ3	I can communicate with the technical support staff through multiple channels when I encounter technical problems.	
	SEQ4	Technical support staff can quickly fix my technical problems.	
	SEQ5	Technical support staff can provide sufficient support regarding the use of BB.	

Table 2: Summary of the Study Measures

## 5. Results and Data Analysis

Structural equation modeling (SEM) is a second-generation multivariate data analysis method (Wong, 2013) that is considered as a powerful analytical technique that has been applied in numerous researches in e-learning acceptance context (Motaghian et al., 2013; Wang & Wang, 2009; Yuen & Ma, 2008). SEM was applied in this study through two phases. First, confirmatory factor analysis (CFA) was used to examine validity, reliability and overall fit. Second, the proposed hypotheses were tested using the structural model.

Construct	Indicator	Factor Loading	Composite Reliability	Cronbach's Alpha (after EFA)	Average Variance Extracted
IMG	IMG1	0.836	0.858	0.920	0.668
	IMG2	0.844			
	IMG3	0.770			
TO	TO1	0.679	0.777	0.600	0.500
	TO2	0.597			
	TO3	0.737			
	TO4	0.712			
PEOU	PEOU1	0.743	0.845	0.872	0.579
	PEOU2	0.727			
	PEOU3	0.850			
	PEOU4	0.716			
PU	PU1	0.765	0.820	0.914	0.603
	PU2	0.816			
	PU3	0.746			
BI	BI1	0.774	0.816	0.812	0.597
	BI2	0.747			
	BI3	0.796			
SU	SU1	0.817	0.846	0.882	0.647
	SU2	0.842			
	SU3	0.751			
SN	SN1	0.667	0.759	0.789	0.513
	SN2	0.713			
	SN3	0.765			
REW	REW1	0.644	0.676	0.818	0.512
	REW2	0.781			
	REW3*	0.471			
IQ	IQ1	0.796	0.877	0.942	0.705
	IQ2	0.853			
	IQ3	0.868			
SQ	SQ1	0.630	0.839	0.894	0.500
	SQ2	0.707			
	SQ3	0.758			
	SQ4	0.616			
	SQ5	0.636			
	SQ6	0.739			
SEQ	SEQ1	0.641	0.908	0.896	0.669
	SEQ2	0.694			
	SEQ3	0.884			
	SEQ4	0.915			
	SEQ5	0.914			

Table 3: Results of Measurement Model

### 5.1. Results of Hypotheses Testing

The current study has been chosen the Partial Least Squares (PLS), as multivariate data modeling method, to allow the analysis of multiple relationship between the constructs (Sanchez, 2015). This approach is well suited to composite models (containing a lot of explanatory factors) with small sample size (Wong, 2013; Hulland, 1999). The measurement model was tested to ensure satisfactory psychometric properties, then the structural model was tested. The results support eleven out of the twelve proposed hypotheses. The structural model was verified by calculating R



square values ( $R^2$ ) and the path coefficient beta ( $\beta$ ). Figure 2 and Table 4 illustrate the results of the PLS structural model and the hypotheses path, significance of the path coefficients and the influence of the independent variables.

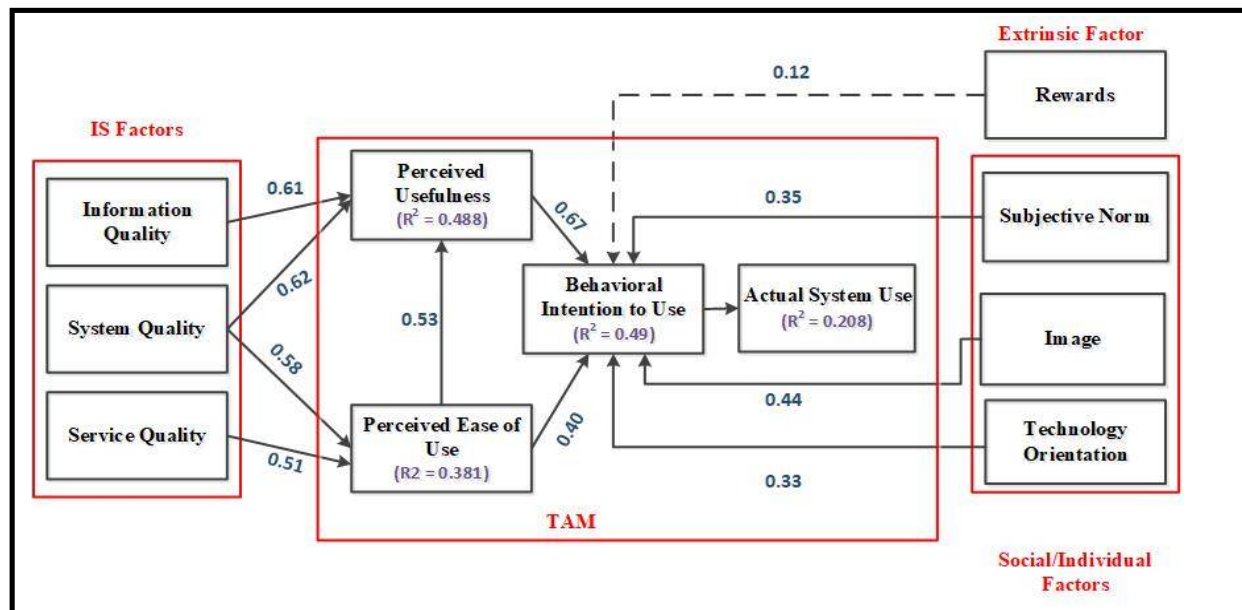


Figure 2: Results of the Structural Model

As recognized from table4, P values of most of the hypotheses is less than 0.01. The only exception is the P values of Hypothesis7 (0.090) which is greater than both values, 0.01 and 0.05, indicating that rewards had no statistically significant impact. Hence, hypothesis7 is rejected, whereas all other hypotheses are supported.

Hypothesis H1b and H2 were supported, showing PU and PEOU significantly affects instructors' BI to use Blackboard. Hypotheses H4, H5, and H6 also were supported, which implies that social/individual variables (SN, image, and technology orientation) significantly encourage the BI to use Blackboard.

Note that PU ( $\beta=0.67$ ) has the highest contribution to BI, followed by image ( $\beta=0.44$ ), PEOU ( $\beta=0.40$ ), SN ( $\beta=0.35$ ), and lastly technology orientation ( $\beta=0.33$ ). Altogether, variables that directly influence BI accounted for 49.3% of its variance. Research data confirmed the hypotheses H1a, H8, and H9a, showing that PEOU, IQ, and SQ have a direct effect on PU. SQ ( $\beta=0.62$ ) contributed more than IQ ( $\beta=0.61$ ) and PEOU ( $\beta=0.53$ ). The three variables altogether had direct influence on PU accounted for 48.8% of its variance.

Hypotheses H9b and H10 were supported, which implies that both SEQ and SQ have a direct effect on PEOU. SQ ( $\beta=0.58$ ) contributed to PEOU more than SEQ ( $\beta=0.51$ ). Both of them together had a direct influence on PEOU accounted for 38.1% of its variance.

Hypothesis H3 was supported, showing that instructors' BI directly influences their actual use of Blackboard. BI contributed to SU significantly ( $\beta=0.46$ ), and accounted for 20.8% of its variance.

No.	Hypothesis Path	R <sup>2</sup>	Path Coefficient ( $\beta$ )	T-Value	P-Value Sig.	Supported?
H1a	PEOU --> PU	0.282	0.531*	8.824	0.000	Yes
H1b	PEOU --> BI	0.157	0.397*	6.080	0.000	Yes
H2	PU --> BI	0.452	0.672*	12.783	0.000	Yes
H3	BI --> SU	0.208	0.456*	7.209	0.000	Yes
H4	SN --> BI	0.119	0.345*	5.180	0.000	Yes
H5	IMG --> BI	0.195	0.442*	6.927	0.000	Yes
H6	TO--> BI	0.107	0.327*	4.861	0.000	Yes
H7	REW --> BI	0.014	0.120	1.701	0.090	No
H8	IQ --> PU	0.367	0.606*	10.723	0.000	Yes
H9a	SQ --> PU	0.380	0.617*	11.025	0.000	Yes
H9b	SQ -->PEOU	0.337	0.581*	10.045	0.000	Yes
H10	SEQ -->PEOU	0.258	0.508*	8.296	0.000	Yes

Table 4: Assessment of the Structural Model in PLS

\*Significance Level 0.01

## 6. Discussion and Conclusion

As Higher education institutions are providing a considerable investment of money, time, and resources for purchasing LMSs and developing course materials, they should start by conducting studies prior an LMS implementation to avoid failure and unexpected situation, and to ensure the best ways to employ them according to their faculties'

requirements. This research focused on the determinants of faculty members' acceptance and adoption of an LMS in the context of Higher education in Saudi Arabia- KAU.

The study aims to develop an inclusive model for assessing the success of e-learning application. The proposed model was constructed based on wide-ranging review of related literature employing three perspectives for assessing the success of e-learning: TAM/TAM2, D&M IS success model, motivation theory.

The study suggested a research model by integrating concepts of user's perception, IS success, social/ individual factors, and extrinsic motivators. Structural equation modeling was utilized to empirically test the hypothesized model. The findings show substantial support for the proposed model. Among twelve suggested relationships, eleven were confirmed. Hence, valuable insight into faculty members' acceptance and adoption of LMSs in the Higher Education context.

Study results are mainly consistent with earlier research in technology acceptance and use. In particular, all the connections originated by TAM were tested, and the results were supportive to TAM and several recent studies such as: (Alharbi & Drew, 2014; Devaraj et al., 2008; Halawi & McCarthy, 2007; Venkatesh & Davis, 2000). Moreover, the findings demonstrate the role of image, SN, and technology orientation directly on the intention to use BB, whereas IS factors (IQ, SQ, SEQ) have indirect impact on behavioral intention through TAM main constructs, PU and PEOU.

In addition, the study findings provide important implication for developing better and deeper understanding of e-learning systems adoption in Saudi Arabia, as well as valuable insights for decision makers at KAU, and other Saudi universities, to help them focus on instructors needs and consequently employ the organizational resources in more effective manner to raise the level of systems usage.

However, the current study contributes to the existing literature by investigating a factor that has been relatively unexplored- to our best knowledge- in the e-learning context (i.e. technology orientation).

Based on the study finding of rewards, extrinsic rewards were found insignificant to instructors' behavioral intention and faculty members were concerned about recognition more than workload and monetary rewards as motivators. Therefore, it would be useful if decision makers at KAU put more effort to create and activate appropriate plans to motivate instructors through recognition.

According to (Hulland, 1999), multi-dimensional construct should be divided into separate constructs that represent each dimension. Thus, it might be more useful for researchers to measure the effect of different types of rewards (i.e. monetary/tangible, intangible) separately in order to get more valuable accurate results, since each might have different impact on technology/LMSs usage.

As people views, perceptions, and attitude are dependent on their personality traits, psychological theories should be incorporated in IS future research especially the research for technology acceptance and use (Devaraj et al., 2008). One of the most popular personality theories is the Five-Factor Model (FFM).

Future research could take variety of approaches. Researchers may use variety of samples in similar and different context for further validation and refinement of the proposed model. For example, the model can be tested among many samples belonging to various higher education institutions. Additionally, different contexts can be considered as using LMSs in elementary and high schools.

Since administration views and perceptions are as important as instructors' perceptions. It is highly recommended to consider people from administration in addition to instructors in future research. This will help to reduce the gap between them, and eliminate the disagreement between administration and faculty perception on what motivators would encourage faculty to join in e-learning (Schifter, 2000), which might lead to undesired situation if existed.

Although this study has investigated the acceptance of LMSs from multiple perspectives, and the factors of the proposed model explained substantial amount of the variance of system use ( $R^2=0.208$ ), there is still large scope for enhancement. Many factors, not considered in this study, could be included in models of future research. These may include cognitive variables, such as: result demonstrability, output quality and job relevance, as proposed by TAM2 (Venkatesh & Davis, 2000) who considered them strong effective factors but have rarely investigated. Also, it is strongly recommended to involve environmental/ cultural factors (Wang & Wang, 2009), as well as organizational factors. Also, intrinsic motivators, as intellectual challenge, ability to reach new audiences, and the overall job satisfaction, are suggested to be investigated, especially that extrinsic motivators (rewards) found to be insignificant in the current study. Moreover, the distinction between voluntary and mandatory e-learning systems' usage could be a future research issue. The study constructs might differently affect instructors' intentions in each case.

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