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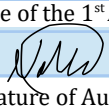
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Assessing EFL Instructors' Use of Learning Management Systems in Higher Education Within the Technology Acceptance Model Framework

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Abstract
This study investigates the factors influencing the use of learning management systems (LMSs), specifically Blackboard, among English as a foreign language (EFL) instructors in higher education in Saudi Arabia. Furthermore, it examines the moderating effect of years of experience using LMSs on EFL instructors' perceptions and use of these systems. The study extends the technology acceptance model (TAM) by incorporating three external variables: perceived self-efficacy, facilitating conditions, and system quality. The study model assessed the hypothesized relationships between TAM constructs and the moderating effect of years of experience. Based on an analysis of 155 online surveys, the study supported ten out of fourteen hypotheses in the proposed model. The findings contributed to validating TAM for predicting EFL instructors' use of LMSs in higher education. The results revealed that instructors' attitudes are a crucial factor that directly influences their behavioral intentions and indirectly influences their actual use of LMSs. Furthermore, perceived self-efficacy and system quality strongly influence instructors' perceptions of usefulness and ease of use of LMSs, subsequently affecting their attitudes toward LMSs. Facilitating conditions had a direct positive effect on instructors' perceived ease of use and a negative influence on their attitudes towrad LMSs. However, the findings revealed that years of experience using LMSs had no moderating effect on instructors' perceptions and use of LMSs. The study findings provided several practical and theoretical implications concerning using LMSs among Saudi EFL instructors in higher education.

Keywords: learning management systems, technology accept model, structural equation modeling, faculty members, facilitating condition, perceived self-efficacy, system quality

Introduction

A learning management system (LMS) is a web-based application that facilitates students' learning across different teaching approaches, including distance, face-to-face, and blended (McGill & Klobas, 2009). These web-based applications provide instructors with various instructional tools embedded within self-contained webpages, allowing instructors to structure academic materials and actively involve students in their learning process (Gautreau, 2011, p. 2). Despite the widespread adoption of learning LMSs in higher education institutions, there is a need to investigate the factors that influence instructors' use of these systems.

Previous research has indicated that faculty members often need to utilize LMSs more effectively, limiting their use primarily to essential functions (Hustad & Arntzen, 2013; Jaschik & Lederman, 2014). The utilization of LMSs among faculty members includes posting course syllabi, recording grades, communicating with students, and sharing lecture content (Jaschik & Lederman, 2014). This underutilization underscores the importance of further research to understand better the factors that affect faculty members' adoption and utilization of LMSs. The successful integration of technology in teaching depends on technology availability and functionality and how instructors adopt and use it within their

teaching practices (Pajo & Wallace, 2001). It is essential to address this underutilization and encourage faculty members to explore and incorporate more advanced features and functionalities of LMSs into their teaching practices. Therefore, gaining insight into the factors influencing faculty members' utilization of LMSs is crucial for promoting their practical use and maximizing these platforms' benefits.

Previous studies conducted in Saudi Arabia have provided limited research on the use of LMSs by instructors, specifically within the TAM framework (Adeinat & Abdulfattah, 2017; Alharbi & Drew, 2014). However, a considerable research gap still exists regarding the impact of external variables, including facilitating conditions, system quality, and perceived self-efficacy, on adopting LMSs among faculty members in Saudi Arabia. This study investigates the factors influencing using Blackboard, a specific LMS, among EFL instructors in higher education in Saudi Arabia. The study extends the original TAM model by incorporating three external variables: perceived self-efficacy, system quality, and facilitating conditions. By examining these factors, the study aims thoroughly comprehend the factors that influence faculty members' acceptance and use of LMSs.

This study specifically investigates the factors influencing EFL instructors' use of LMSs by examining the relationship between the constructs of TAM (perceived ease of use, perceived usefulness, attitudes, behavioral intentions, and actual use) and the effect of three external variables: perceived self-efficacy, system quality, and facilitating conditions on TAM constructs. Including perceived self-efficacy, system quality, and facilitating conditions as external variables in the TAM model expands the scope of analysis and provides a more holistic perspective on the factors influencing LMS acceptance and use. Additionally, this study examines the effect of instructor's length of experience using LMSs on their acceptance and use of these systems. By exploring these factors, the study aims to provide a comprehensive model that predicts faculty members' utilization of LMSs in Saudi higher education. Also, understanding these factors is crucial for various aspects, including the development, selection, training, maintenance, and investments in LMS platforms in higher education.

Theoretical framework and hypotheses developments

Hypotheses related to TAM

The research conceptual framework is mainly based on the TAM proposed by Davis, Bagozzi, and Warshaw (1989). TAM posits two fundamental determinants of users' acceptance of technology: the Perceived Ease of Use (PEOU) and Perceived Usefulness (PU) (Davis, 1989). PEOU is "the degree to which a person believes that using a particular technology would be free from effort." In contrast, PU refers to "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis, 1989, p.320). TAM asserted that PU is influenced by PEOU, meaning that if users find technology easy to use, they are more likely to perceive it as applicable.

The model establishes causal relationships between these fundamental constructs (PEOU and PU) and three other constructs: attitude toward using, behavioral intention to use, and actual use. Attitude toward use describes an individual's attitude towards a specific technology and is considered a mediating variable in the original TAM (Davis, 1989). TAM posited that PEOU and PU influence the users' attitude toward using technology, suggesting that if users perceive technology as accessible and valuable, they develop a positive attitude toward it. Several studies confirmed the influential role of attitudes on behavioral intentions (Davis et al., 1989; Ventkatesh et al., 2003)

Behavioral intention refers to an individual's conscious plans to engage in or refrain from a particular behavior in the future (Davis, 1989). TAM asserted that PU and attitudes directly influence behavioral intentions. Users who find a specific helpful technology develop a positive intention to use it. TAM suggests that users' behavioral intention shapes their actual use of the technology. Based on previous studies, the subsequent hypotheses were put forward:

H1: PU has a significant positive effect on instructors' attitudes toward LMS.

H2: PU significantly positively affects instructors' behavioral intentions of using LMS.

H3: PEOU significantly positively affects instructors' PU of LMS.

H4: PEOU significantly positively affects instructors' attitudes toward using LMS.

H5: Behavioral intentions significantly positively affect instructors' actual use of LMS.

H6: Attitude significantly positively affects instructors' behavioral intentions of using LMS.

These hypotheses are derived from the theoretical foundations of TAM and reflect the relationships between the constructs in the context of instructors' acceptance and use of LMSs. They aim to provide insights into the factors that derive instructors' perceptions, attitudes, intentions, and actual use of LMS.

Hypotheses on the effect of external variables on TAM

The research framework incorporates three external variables that can impact the relationships within the TAM model: perceived self-efficacy, system quality, and facilitating conditions.

Perceived self-efficacy

Perceived self-efficacy refers to an individual's belief in their capability to effectively use the system to achieve desired performance outcomes (Bandura, 1986). In utilizing LMSs, perceived self-efficacy relates to instructors' belief in their ability to use the system effectively for instructional purposes.

Previous research has indicated that users' perceived self-efficacy significantly affects the PEOU of LMSs and e-learning (Park et al., 2012; Venkatesh & Davis, 1996; Terzis & Economides, 2011). This finding suggests that when users have higher levels of self-efficacy in using LMSs, they perceive them to be easier to use. Additionally, studies have found that perceived self-efficacy significantly affects the PU of different types of LMSs and e-learning (Compeau et al., 1999). This finding implies that when users have greater perceived self-efficacy in using LMSs, they perceive them to be more helpful. Studies have reported that perceived self-efficacy significantly influences individuals' behavioral intentions to use new technology. It is mediated by two crucial variables: PEoU and PU (Terzis & Economides, 2011; Venkatesh & Davis, 1996).

Drawings from previous findings, two hypotheses were proposed:

H7: Perceived self-efficacy has a significant positive effect on the PEOU of LMSs.

H8: Perceived self-efficacy has a significant positive effect on the PU of LMSs.

By examining the influence of perceived self-efficacy on these constructs, the study aims to provide insights into the role of perceived self-efficacy in instructors' perception of the easiness and usefulness of LMSs.

System Quality

System quality refers to the preferred features of a system, such as usability, availability, reliability, adaptability, and response time (Delone & Mclean, 2003). It encompasses a system's functionalities designed to meet effectively user needs with ease and minimal disruption (Delone &

Mclean, 2003). In the context of LMSs, system quality represents the extent to which the platform possesses these desired characteristics.

Previous research has consistently revealed the significant effect of system quality on the PU of various information systems, including LMS (Fathema & Sutton, 2013; Park et al., 2012; Pituch & Lee, 2006). This finding suggests that when a system exhibits higher levels of quality, users perceive it to be more helpful. System quality is a crucial determinant of the system's success and strongly influences users' PU (Alshurideh et al., 2019; Rui-Hsin & Lin, 2018). Furthermore, studies have reported the significant positive effect of system quality on users' attitudes toward using different types of technologies, including LMS (Fathema & Sutton, 2013; Park et al., 2012). Additionally, system quality has significantly affected users' behavioral intentions to use technologies, specifically in the context of LMS and mobile learning (Fathema & Sutton, 2013; Park et al., 2012). Three hypotheses were formulated about the relationship of system quality with PU, attitude toward using, and behavioral intentions.

H9: System quality has a significant positive effect on the PU of LMSs.

H10: System quality has a significant positive effect on attitudes toward using LMSs

H11: System quality has a significant positive effect on behavioral intention to adopt LMSs.

Facilitating Conditions

Facilitating conditions refer to an individual's belief that adequate organizational and technical structures are in place to facilitate the system's use (Venkatesh & Davis, 2000). In the context of LMSs, facilitating conditions represent the availability of resources such as technical assistance, internet infrastructure, hardware, software, training, and online help that facilitate the system's effective use.

Previous studies have consistently reported that facilitating conditions influence users' adoption of technology (Teo, 2010; Pajo & Wallace, 2001). They significantly affect instructors' PEOU and attitude toward using technology (Teo, 2010). Two hypotheses were proposed to examine the effect of facilitating conditions on the PEOU and attitudes in the context of faculty attitudes toward LMSs:

H12: Facilitating conditions significantly positively affect instructors' PEOU of LMSs.

H13: Facilitating conditions significantly positively affect instructors' attitudes toward using LMSs.

These hypotheses emphasize the importance of facilitating conditions in shaping faculty members' perceptions and attitudes toward using LMSs. By examining the relationship between facilitating conditions and these constructs, the study aims to provide insights into the role of organizational and technical support in influencing faculty members' acceptance and utilization of LMSs.

The moderating effect of length of experience

The length of experience using a technology is a demographic characteristic that can influence an individual's perception, attitude, and behavioral intentions toward adopting that technology. Previous research has shown that the length of experience using a technology significantly moderates users' acceptance and use of technology. Venkatesh et al. (2012) proposed that the length of experience moderates the effect between behavioral intentions and actual use, and this effect is more substantial among less experienced users. The study hypothesized that the length of experience moderates the relationship between TAM constructs.

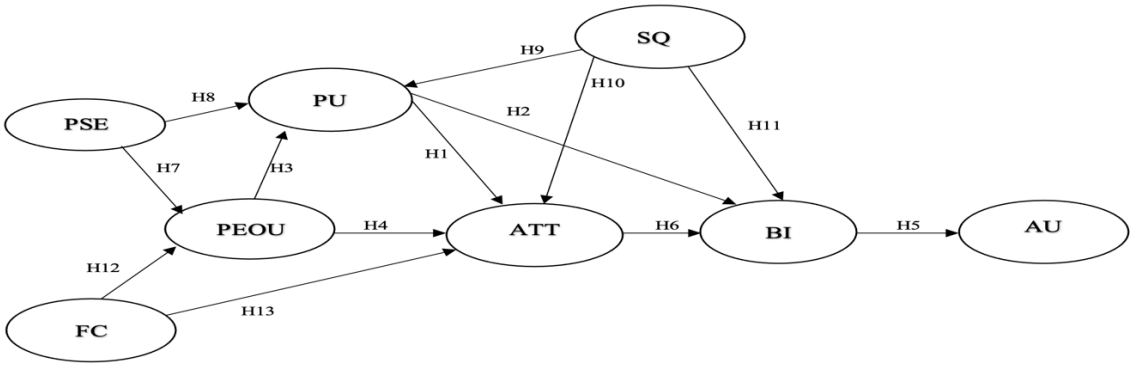
H 14: Years of experience moderate the relationship between the proposed model constructs

Research model

The research model proposed in this study aims to examine the use of LMS, i.e., Blackboard, among EFL faculty members. It extends the original TAM by incorporating three external variables into

TAM: perceived self-efficacy, system quality, and facilitating conditions. The conceptual framework, represented in Figure 1, illustrates the relationships between TAM constructs. The study proposed thirteen hypotheses on the relationship between the model constructs. These hypotheses include the effects of perceived self-efficacy on PEOU and PU, the impact of system quality on PU, attitudes, and behavioral intentions, and the effects of facilitating conditions on PEOU and attitudes.

Furthermore, these hypotheses examined relationships between TAM constructs: PU, PEOU, attitudes, behavioral intentions, and actual use. Additionally, the model hypothesized a moderating effect of years of experience on the relationships between TAM constructs. The proposed model hypotheses guide empirical analysis and contribute to the existing literature on technology acceptance in educational settings.



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Figure 1. Research proposed model

Methodology

Participants

This study involved a total of 155 faculty members from three Saudi universities located in Riyadh. The study used purposive sampling. All respondents had experience in using LMSs. The participants' academic ranks encompassed a range of positions, including professors, associate professors, assistant professors, lecturers, teacher assistants, and language teachers. In terms of age groups, the participants were divided into five categories. Most participants (n=96) fell into the age group of 31-40, while smaller proportions were distributed across the other age categories, and the years of experience using LMS varied among participants, with 15 participants reporting less than three years of experience, 40 participants having 3- 5 years of experience, and a majority of 100 participants having more than five years of experience. This distribution reflected substantial familiarity and proficiency with the LMS platforms among the faculty sample. By including faculty members from different academic ranks, age groups, and years of experience, the study aimed to capture diverse perspectives on using LMSs.

Data instruments

This study used an online self-reported questionnaire. It was divided into three parts, each targeting a specific purpose. The first part focused on gathering demographic information from the respondents, including age, gender, years of experience, and academic rank. This section provided a

comprehensive overview of the participant's background and characteristics, enabling a better understanding of the sample composition.

The second part assessed instructors' perceptions, attitudes, and intentions regarding LMSs. It measures seven constructs: PU, PEOU, attitude, behavioral intention, perceived self-efficacy, system quality, and facilitating conditions. The questionnaire items were adapted from previous studies (Fathema, 2013; Liaw, 2008; Teo, 2010; Venkatesh & Davis, 2000) and measured on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree). The reliability of the measurement scales for each construct was assessed, with a reliability coefficient ranging from .870 to .963

The third section focused on assessing faculty members' actual use of LMSs. The items were adapted from the Fathema et al. (2015) study. The participants were asked to indicate the frequency of their use of LMS on a 7-point Likert scale, ranging from 1 (Not at all) to 7 (to a great extent). This scale scores a coefficient value of 0.875.

Data analysis

In this study, the data analysis involved using Structural Equation Modeling (SEM) with Smart Partial Least Squares (SmartPLS) software. SEM examines the relationships among the variables in the proposed model. Before conducting SEM, the appropriateness of the gathered data was assessed using Kaiser-Meyer-Olkin (KMO) in the Statistical Package for Social Science (SPSS; version 28). The KMO measure was computed, and the results indicated that the KMO value (0.914; $p < .001$) was suitable for running SEM. Furthermore, the normality of the data was tested to confirm that it was normally distributed, with appropriate skewness and kurtosis values. SEM techniques were then employed to evaluate the proposed model's measurement and structural components. SEM allows for examining the relationships among the latent constructs and tests the model's overall fit to the data.

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Results

Measurement model assessment

The measurement model was assessed to ensure the validity and reliability of the research items using various criteria, including convergent and discriminant validity. Convergent validity was assessed by testing factor loadings, internal consistency, average variance extracted (AVE), and composite reliability. A threshold of 0.7 was considered to assess individual item loadings, indicating that each item should have a loading above this value to demonstrate convergent validity (Chin, 1998). The results indicated that all item loadings exceeded the threshold, implying that the survey items were sufficient for measuring each construct individually. Table 1 displays item loadings between 0.988 and 0.821, exceeding the suggested acceptable value.

Table 1. *Factor loading*

Items	Factor loading							
ATT1	0.950							
ATT2	0.971							
ATT3	0.962							
ATT4	0.959							
AU1		0.940						
AU2		0.967						
AU3		0.946						
BI1			0.981					
BI2			0.988					
BI3			0.983					
FC1				0.888				

FC2				0.932				
FC3				0.936				
PEOU1					0.910			
PEOU2					0.930			
PEOU3					0.962			
PEOU4					0.955			
PU1						0.957		
PU2						0.973		
PU3						0.965		
PU4						0.948		
PSE1							0.961	
PSE2							0.968	
PSE3							0.942	
SQ1								0.916
SQ2								0.821
SQ3								0.944
SQ4								0.859

Internal consistency was assessed using Cronbach's alpha to verify that each item was loaded into its corresponding construct group with an adequate value above 0.5 (Hair, Black, Babin, & Anderson, 2006). The results indicated that Cronbach's alpha ranged from 0.908 to 0.984, exceeding the acceptable value (see Table 2). Composite reliability, which indicates the reliability of the constructed items, was also above the minimum acceptance value of 0.7, ranging from 0.989 to 0.936. The average variance extracted (AVE) was evaluated to assess convergent validity, and the results indicated appropriate values. Table 2 indicates that the convergent validity was satisfactory as all constructs met the recommended values of AVE > 0.50 and CR > 0.70 (Fornell & Lacker, 1981).

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Table 2. *Average Variance Extracted (AVE), Composite Reliability (Cr), and Cronbach's alpha*

	Cronbach's alpha	AVE	Cr (rho-c)
ATT	0.972	0.972	0.979
AU	0.947	0.948	0.966
BI	0.984	0.984	0.989
FC	0.908	0.908	0.942
PEOU	0.956	0.956	0.968
PU	0.972	0.972	0.980
PSE	0.954	0.954	0.970
SQ	0.908	0.919	0.936

Discriminant validity was assessed using the Fornell-Larckers Criterion. Discriminant validity tests whether there is a lack of a relationship between measurement items that theoretically should not be related. To demonstrate, the square root of each construct should exceed its correlation with any other construct (Fornell & Lacker, 1981). As shown in Table 3, the correlation for each construct in the horizontal and vertical columns did not exceed the square root of demonstrating sufficient discriminant validity. Thus, discriminant validity was satisfactory for all constructs.

Table 3. *Discriminant validity (Fornell-Larckers Criterion)*

	ATT	AU	BI	FC	PEOU	PU	SE	SQ
ATT	0.960							
AU	0.559	0.951						
BI	0.923	0.535	0.984					

FC	0.645	0.349	0.630	0.919				
PEOU	0.900	0.509	0.861	0.736	0.940			
PU	0.939	0.505	0.884	0.651	0.845	0.961		
PSE	0.860	0.466	0.827	0.679	0.881	0.785	0.957	
SQ	0.875	0.443	0.794	0.654	0.849	0.809	0.872	0.886

The estimated structural model's fit was assessed using: the Normed Fit Index (NFI) and the Standardized Root Mean Square Residual (SRMS). These indices provide insights into how well the model fits the observed data. Table 4 displays the estimated structural model SRMR value of .05 and NFI value of 0.861. The SRMR measures the discrepancy between the observed covariance matrix and the model-implied covariance matrix. A lower SRMR value indicates a better fit, with a value below 0.08 generally considered acceptable (Hu & Bentler, 1999). The NFI measures the relative fit of the estimated model compared to the saturated model. It ranges from 0 to 1, with higher values indicating better fit. A value of 0.86 indicates a reasonable fit. The results reveal that the model is a good fit.

Table 4. *Model fit indices*

Indices	Saturated model	Estimated model
SRMR	0.040	.050
NFI	.856	.861

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Structural Model Assessment

The structural model was assessed using SEM analysis, which provides essential information regarding the standardized path coefficients (β) and the squared multiple correlations (R^2) for each endogenous construct. These measurements are crucial in assessing the predictive power and strength of the hypothesized relationships within the structural model. The standard path coefficients suggest the strength of the causal relationship between two constructs, whereas R^2 measures the percentage of the variance explained in the endogenous variable by the exogenous variable in the model (Wixom & Watson, 2001).

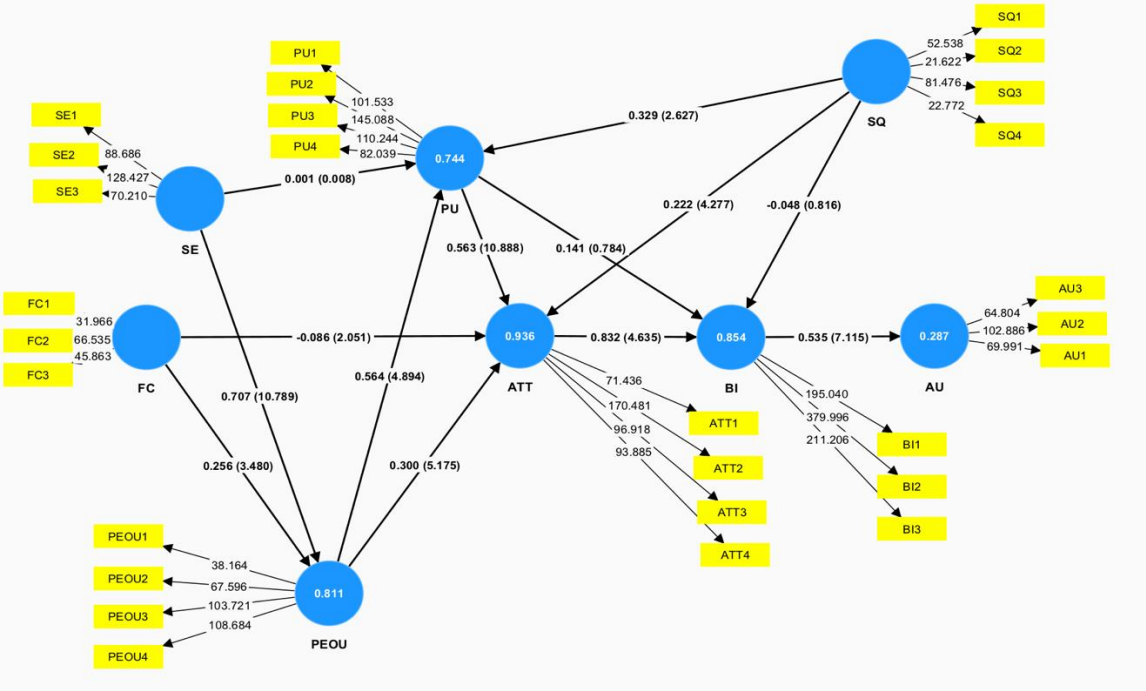


Fig 2. Structural model

Path coefficient value (t-value)

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Hypotheses testing results

The structural model employed the bootstrap resampling technique in SmartPLS to enhance the reliability of the results. The study used path analysis to examine several hypotheses concerning instructors' perceptions, attitudes, intentions, and use of LMS. This analysis involved standardized path coefficients and associated *t*-values (see Figure 2). The *t*-value served as a criterion for accepting or rejecting a hypothesis, with acceptance criteria being a *t*-value above or equal to the range (-1.65 to 1.65) and a significant *p*-value ($p > .05$).

The results of hypotheses testing indicated that several hypotheses, H1, H3, H4, H5, H6, H7, H9, H10, H12, and H13, were supported, as the associated path coefficients were statistically significant ($p<0.05$), and the t-values exceeded the acceptance threshold (see Table 5). These findings indicated substantial direct effects between the constructs under investigation.

However, the results rejected three hypotheses on the relationship between TAM constructs. H2, which proposed a direct effect between PU and behavioral intention, did not have a statistically significant path coefficient. Similarly, H8, which proposed a direct impact between perceived self-efficacy and PU, was rejected due to the need for statistical significance in the path coefficient. This finding revealed no direct relationship between these two constructs. H10, which hypothesized a significant relationship between system quality and behavioral intentions, was also rejected based on the need for statistical significance in the path coefficient.

It is worth noting that the relationship between facilitating conditions and attitudes was significantly negative. This finding suggested that facilitating conditions reverse affect instructors' attitudes toward LMSs.

Table 5. *Hypothesis testing of main effects using path coefficient analysis*

Hypothesis	Path coefficient	Path coefficient β	T value	P value	Result
H1	PU→ATT	0.563	10.888	0.000	Accepted
H2	PU→BI	0.141	0.784	0.433	Rejected
H3	PEOU→ PU	0.564	4.894	0.000	Accepted
H4	PEOU→ ATT	0.300	5.175	0.000	Accepted
H5	BI→AU	0.535	7.115	0.000	Accepted
H6	ATT→BI	0.832	4.635	0.000	Accepted
H7	PSE→PEOU	0.707	10.789	0.000	Accepted
H8	PSE→PU	0.001	0.008	0.993	Rejected
H9	SQ→PU	0.329	2.627	0.009	Accepted
H10	SQ→ATT	0.222	4.277	0.000	Accepted
H11	SQ→BI	-0.048	0.816	0.415	Rejected
H12	FC→PEOU	0.256	3.480	0.001	Accepted
H13	FC→ATT	-0.086	2.051	0.040	Accepted

The moderating effects of years of experience

The study examined the moderating effects of years of experience using LMS on faculty members' use of LMS for language learning. A multigroup analysis examines the impact of this moderating factor on the proposed model constructs. Table 6 presents the results of this analysis, including the path coefficient, the permutation test, and the p-values, which indicate the significance of the difference between the less experienced and more experienced groups.

Retracted

The findings from the multigroup analysis revealed that LMS years of experience did not have a significant moderating effect on the relationships between the research model constructs. The p-values for all paths were above the significant level (0.05), indicating that the differences between these two groups were not statistically significant. As a result, hypothesis 14, which proposed that LMS years of experience would act as a moderator for the relationships between the model constructs, was rejected. The lack of significant differences between less experienced and more experienced instructors indicated that the impact of years of experience on the relationship between TAM constructs needed to be more substantial.

Table 6. *Multigroup analysis of the moderating effect of years of experience*

Path	Path coefficient β		Permutation test		Result
	Less experienced	More experienced	Difference	p-value	
PU→ATT	0.608	0.556	.001	0.664	Rejected
PU→BI	-0.210	0.274	.030	0.238	Rejected
PEOU→ PU	0.513	0.623	-0.006	0.679	Rejected
PEOU→ ATT	0.303	0.234	-0.006	0.566	Rejected
BI→AU	0.567	0.489	0.002	0.600	Rejected
ATT→BI	1.207	0.704	-0.032	0.232	Rejected
SE→PEOU	0.627	0.750	0.001	0.416	Rejected
SE→PU	-0.004	-0.010	0.018	0.987	Rejected
SQ→PU	0.400	0.276	-0.013	0.668	Rejected
SQ→ATT	0.144	0.300	-0.002	0.158	Rejected
SQ→BI	-0.114	-0.027	0.005	0.529	Rejected
FC→PEOU	0.329	0.213	0.007	0.507	Rejected

FC→ATT	-0.031	-0.110	0.007	0.412	Rejected

The revised proposed model

The proposed model was revised based on the results of the SEM analysis, in which three hypotheses were not supported. These revisions were made to ensure the accuracy and validity of the research model. The revised relationships were PU toward behavioral intentions, system quality towards behavioral intention, and perceived self-efficacy towards PU. These relationships were statistically insignificant. Therefore, they have been removed from the proposed model as they have no direct relationships.

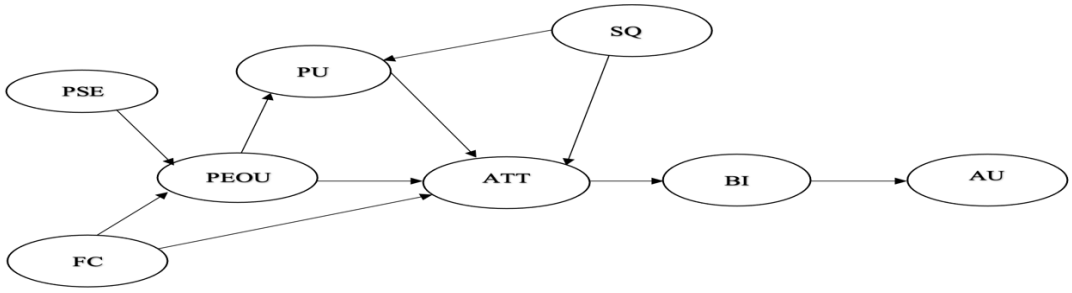


Fig 3. The revised proposed model

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The results of SEM analysis revealed the presence of indirect relationships among the model constructs. Indirect effects arise when the relationships between two variables are influenced by one or more additional variables within the model. These indirect effects can provide valuable insights into the underlying mechanisms and pathways through which constructs influence each other. Table 7 presents the total indirect effects, including each path's path coefficients, t-values, and p-values for each path. The study hypothesized a direct relationship between PU and behavioral intention; however, the results revealed that PU indirectly affects behavioral intentions mediated by attitudes. In addition, contrary to the hypothesized direct relationship, the study found indirect effects in the relationships between system quality and behavioral intentions and perceived self-efficacy and PU. Furthermore, findings revealed that factors such as attitudes, PU, PEOU, perceived self-efficacy, and system quality indirectly affect instructors' actual usage of LMS.

Table 7. *Total Indirect effects*

Path coefficient	Path coefficient β	T value	P value
ATT->AU	0.441	4.029	.000
FC->ATT	0.158	2.895	.004
FC->PU	0.144	2.637	.000
PEOU->ATT	0.314	4.343	.000
PEOU->AU	0.315	4.921	.000
PEOU->BI	0.586	6.595	.000
PSE->ATT	0.436	5.620	.000
PSE->AU	0.226	4.036	.000
PSE->BI	0.420	5.082	.000
PSE->PU	0.391	4.755	.000
PU->AU	0.325	4.601	.000
PU->BI	0.460	4.706	.000

SQ->ATT	0.183	2.684	.007
SQ->AU	0.180	3.248	.001
SQ->BI	0.377	4.263	.000

Discussions and conclusions

Summary of Key Findings

The study findings confirmed previous research on the relationship between TAM constructs, as proposed by Davis (1989). However, there was an interesting deviation from earlier studies regarding the relationship between PU and behavioral intention. Contrary to prior findings, this study found an insignificant direct relationship between PU and behavioral intentions. The study found this relationship to be indirect and mediated by the construct attitude.

Examining the relationships between TAM constructs revealed that instructors' attitudes were the most vital determinant influencing their behavioral intention to adopt LMSs. This finding aligns with previous research (Davis et al., 1989; Ventkatesh et al., 2003), highlighting the importance of positive attitudes in deriving instructors' behavioral intentions to adopt LMSs.

The study also explored the relationship between three external variables- system quality, self-efficacy, and facilitating condition- with the TAM constructs. The results revealed several noteworthy findings. First, faculty members' perceived self-efficacy was a significant factor influencing their PEOU, consistent with previous studies (Holden & Rada, 2011). However, it had an insignificant effect on PU, contrasting with previous findings (Ong & Lai, 2006; Ong et. al., 2004). This finding indicates that faculty members with higher self-efficacy perceive LMS as more straightforward to use than those with lower self-efficacy. Second, system quality was a significant factor influencing faculty members' PU and attitude. However, it did not significantly affect their behavioral intention to adopt LMS. This finding implies that while faculty members perceive the system quality as influential in determining the usefulness and their attitudes towards LMS, it does not directly impact their intentions to adopt it. Third, the facilitating condition was an essential factor that positively influenced faculty members' PEOU. However, the study revealed a negative significant relationship between facilitating conditions and faculty members' attitudes towards LMS. This finding suggests that despite lacking assistance in facilitating conditions for using LMS platforms, instructors still demonstrated positive attitudes towards the LMS. This reverse relationship attributed to the perceived usefulness of LMS outweighing the absence of facilitating conditions and contributing to positive attitudes.

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Additionally, the study revealed several indirect effects, highlighting the complex relationships between TAM constructs in the context of assessing faculty members' use of LMS. Understanding these indirect relationships can provide valuable insights for designing interventions and strategies to promote the effective use of LMS among instructors.

Concerning the moderating effects of years of experience using LMSs, the results revealed that this factor had an insignificant moderating effect on the proposed model constructs. This finding implies that less experienced and experienced instructors using LMS have no statistically significant differences regarding their perceptions, attitudes, intentions, and usage of LMS. The length of experience using LMS has been found to be an insignificant factor in the acceptance of this platform.

Contributions and Implications

The results have several theoretical and practical implications. The study findings provided practical implications to be considered to ensure increased use of LMS by faculty members in higher

education. Firstly, the study found that system quality is a salient factor shaping faculty member's LMS use. Therefore, LMS designers and university policymakers should concentrate more efforts on improving the quality of this platform to make it more usable to the faculty members. The interface, features, functions, contents, navigation speed, and interaction capability of LMS platforms should be periodically monitored and improved according to the faculty members' needs. Secondly, the study results revealed that self-efficacy was a significant and salient factor in determining users' acceptance of LMS. Therefore, once a new LMS is adopted, it is essential to inform the faculty members about its features, usefulness, and technical issues. This approach enables them to comprehensively comprehend the LMS and foster confidence in utilizing it. Universities should offer periodic training programs and extended online help for LMS use. Thirdly, results indicated that facilitating conditions negatively affected faculty attitudes toward LMS. This finding means that instructors have positive attitudes toward LMS, although they have had no assistance using this platform. Therefore, universities need to pay attention to ensure the availability of reliable network access and technological support to ensure the smooth running of LMS.

Moreover, the study's results contributed to the TAM model's validation and applicability in predicting faculty members' acceptance of LMS. The study's validation of the TAM model strengthens its theoretical foundation. It provides theoretical implications by advancing our understanding of user acceptance concerning the effects of different factors, including PU, PEoU, and behavioral intentions, and the role of moderating factors in the adoption of Blackboard.

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Limitations and Future Research

This study has several limitations. Firstly, the data collection relied on a self-reported questionnaire that was subject to potential biases. Future research could consider employing additional methods, such as interviews or classroom observations, to triangulate the findings. Secondly, the study focused on the effects of three external factors on faculty members' acceptance of LMS; further research should include other potential factors within the TAM framework. Thirdly, it is essential to note that the length of years of experience using LMS did not emerge as a significant moderator in this study; other factors may still act as moderators in explaining the relationships among the constructs of the model constructs. Further research could explore additional moderators or external factors influencing faculty members' acceptance and adoption of Blackboard for language learning.

Conclusion

This study contributes to validating TAM for predicting EFL instructors' use of LMSs for language learning in higher education. The study confirmed previous findings on the effect of external factors, perceived self-efficacy, systems quality, and facilitating conditions on an individual's use of LMSs. The study also highlighted the insignificant moderating role of length of experience on instructors' perceptions, attitudes, intentions, and use of LMS. The study findings generally supported the proposed model with minor revisions.

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Conflicts of Interest

The authors declare no conflict of interest.

Authenticity

This manuscript is an original work

Artificial Intelligence Statement

AI and AI-assisted technologies were not used.

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