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FACTORS AFFECTING INSTRUCTORS' ADOPTION OF LEARNING MANAGEMENT SYSTEMS: THE CASE OF PALESTINE

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ABSTRACT

Although web-based learning systems are emerging as a useful tool for facilitating teaching and learning activities, instructors' use of learning management systems in higher educational institutions is still limited. In this context, this empirical research investigates factors that can potentially contribute to learning management system adoption in Palestinian institutions of higher education. In addition, the study also developed an integrated model of instructor adoption of learning management systems by incorporating existing literature and multiple empirically verified theories, including the technology acceptance model and DeLone and McLean's information system success model. Survey data collected from 365 university instructors were examined to evaluate the influence of various constructs on lecturers' adoption of learning management systems using structural equation modeling. The research results show that perceived usefulness, perceived ease of use, system quality, information quality, service quality, management support, resistant to change, personnel IT innovativeness, attitude toward the system, computer efficacy and subjective norms influence instructors' intention to use learning management systems. Findings of this research will be valuable for academicians and practitioners in implementation, management and continuous improvement of learning management systems.

Keywords: *IS Success Model, Learning Management Systems (LMS), LMS Adoption, Structural Equation Modeling, Technology Acceptance Model (TAM).*

1. INTRODUCTION

Information and communication technology (ICT) development has expanded up to other fields and opened numerous possibilities in education, communication, and business. It has been mentioned by many researchers that the effect of ICT in the educational sector is remarkable. University administrators and policymakers have perceived information technology as an essential part of training and teaching, especially in higher education. According to [1], ICT became more robust and much easier to implement, allowing it to penetrate through academic activities at different levels. The main shift of ICT and its wide application in education has prompted the present of new terms in the academic field such as learning management systems (LMS). LMS was adopted in the academic field and their values in the institutions of higher education have significantly increased [2]. Among categories of ICT, LMS is an important tool among users, which help to teach and learning procedures [3]. These systems can possibly transform and reorganize the traditional model of higher education and have the potential to change the way society retain and access knowledge. [4]. Thus, it is has become significant to apply information systems to reduce cost, improve instructors' teaching performance and facilitate student learning.

As a way to keep up with the rapid changes in e-learning system worldwide in higher education institutions, Palestine is striving to include educational reforms to implement information technology (IT) more efficiently in education as a whole [5]. However, despite the potential of LMS to support teaching and learning,

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the majority of LMS initiatives do not fulfill their potential as they fail, either totally or partially [6]. This new technology isn't being utilized to its fullest potential and capacities. It faces several problems such as resistance from faculty members [7], the number of users (instructors and students) of the learning management system is not growing as fast as anticipated [8] and instructor's adoption of e-learning management system is still exceedingly low and limited [9]. This limited rate is disturbing for policymakers and educational administrators as the real benefits and the outcome are subject to the extent which instructors can use the IT Systems. Many higher educational institutions (HEI) still ventures into e-learning based systems not minding the critical area that needs due attention [10]. These uncertainties make it so difficult for e-learning administrators to focus only on the effective factors, and therefore, a complete understanding of those effective critical factors of e-learning adoption is required. As a result, this study aims at identifying the factors affecting instructors' adoption of LMS in the context of higher education in Palestine and to develop and empirically examine an integrated model of adoption of LMS incorporating different factors and dimensions.

2. LITERATURE REVIEW

2.1 Learning Management Systems (LMS)

Different LMS have been developed for higher education to support e-learning. For example, the web course homepage system, Blackboard learning system, Moodle learning management system, web course tool are the most recent technology-based academic applications that use the internet as a delivery mechanism. "Because of the fast development of information systems (IS) in higher education, academic institutions around the world are investing heavily in various LMS to deliver and manage e-Learning services". LMSs are defined by Van and Scheper [11] as "a web-based communications platform that allows students and instructors without the limitation of time and place to access different learning tools". The intention of LMS is not only to improve the effectiveness and efficiency of learning [12] but also to provide an alternative approach in giving instruction. Many of the prior LMSs studies found that not all the functions of LMSs were equally used by the users, some functions are used more frequently than the other functions. Specific challenges including system problems and design flaws reduce the overall utilization of the LMS by faculty members.

2.2 Technology Acceptance Model (TAM)

TAM is an adaptation of the theory of reasoned action (TRA) to the field of the information system. TAM was established by Davis [13] to explain IT/IS usage behavior. Looking at the attitudes, and actual system use, TAM is used to provide an explanation of the determinants of computer acceptance and has been widely acknowledged and accepted in correlated ICT adoption studies [14]. TAM examines the mediating role of perceived ease of use (PEOU) and perceived usefulness (PU) in their relationship between external variables and the probability of system adoption. However, TAM main structures do not completely reflect the precise influence of the factors that could influence individuals' adoption of IS.

2.3 Delon and McLean Information System Success Model

DeLone and McLean [15] introduced the information system success model which is considered generally acknowledged and cited model. This model included six information system successes dimensions which are an organizational impact, individual impact, user satisfaction, system use, information quality, and system quality. These categories of IS success are consistent rather than independent. According to [16] the model provides two significant contributions to information system success domain. First, it presents a method for classifying the massive amount of IS success variables presented in IS literature. Second, it proposes a model of sequential interdependencies between the dimensions.

DeLone and McLean [17] additionally extended the model by including net benefits, intention to use and service quality as new dimensions. Even though there is a solid proof that D&M success model can predict the success of an e-learning system, a limited number of researches have been directed to observationally explore the adoption of e-learning systems from an information system point of view [18]

3. PROPOSED RESEARCH MODEL

Within the domain of IS studies, various theories and models are used to examine determinants of e-learning adoption. These models and theories present a practical guide for researches

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on IS successful adoption. The model of this empirical research is conceptualized in light of the technology acceptance model (TAM) [13] and DeLone and McLean IS model (D&M) [15].

The study categorized different constructs into main dimensions. The first dimension -user believe-, is constructed mainly from TAM includes three factors: PU, PEOU, and actual adoption. The next dimension contains system factors (system quality, information quality, service quality) adopted from D&M IS model, individual/instructors' factors (resistance to change, personnel IT innovativeness, attitude toward system, computer efficacy and knowledge), subjective norms as a social factor, organizations factors (facilitating conditions, top managerial support) are all anticipated to be external factors for TAM. The final dimension included the net benefit of the actual LMS adoption which is adapted from D&M IS model. The rationale for this selection is that these factors have shown to have significant effects on the intention to use web-based learning systems through PU and PEOU in the existing literature. Researches in the areas of education and technology adoption, in general, indicate that these factors significantly related to the instructor intention to use web-based learning systems. The reason for this integration of different theoretical models was the complexities of the organizational and social context within which instructors with varying individual personality traits make up their decision in using e-learning systems.

Contrary to preceding works and existing models in instructors' adoption of e-learning systems, the research scope of this study extended by considering the most significant factors verified in the related literature to apply them in the local context. It is recognized that in developed countries, most of the studies focus on access to technology and context whereas in developing countries the majority are concern on individuals, with few studies exhibit a comprehensive view. As a result, the proposed research model included factors that have not been incorporated into one framework formerly, which allows simultaneously examining for validation and relationship. Most of the previous researches didn't employ a framework for building research models, they have examined instructors' adoption of LMS by using TAM or expanding it with some additional factors. This situation is a limitation as there is no apparent prototype in selecting the external factors of any IS research model. Researchers are encouraged to keep away from applying a single linear method when assessing instructors' adoption of e-learning system [19]. As a result, to assess the factors affecting LMS adoption, this research study used a multidimensional approach, and the variables of the research model are chosen under the control of related dimensions.

4. VARIABLES IDENTIFICATION AND HYPOTHESES FORMULATION

4.1 User Believe Factors

The user's believe dimension looks at a person's psychological observation regarding the performance of the system and one trusts that utilizing the system will have practical job-related results [20]. This dimension is based on the generic TAM, consists of PEOU, PU, and system use. The study used TAM as one of the models to construct the proposed model. PU is proposed to have a direct impact on system use because instructors will be more willing to use a system if it is deemed beneficial. On the other hand, extensive research over the past decades has provided evidence that PEOU has a considerable consequence on system use, either directly or indirectly, through its effect on PU. The easier it is for a user to interact with a system, the more probable he or she will consider it beneficial and use it.

Ong and Lai [21] stated that PU has a consequence on instructors' interest in e-learning system use and adoption. Individuals, who believe in a positive use-performance relationship, might encourage the acceptance of information system [13] and that will persuade behavioral intention to adopt that technology. In their empirical research study, Tung and Chang [22] emphasized that when instructors alleged e-learning as useful, probably they will be more likely to adopt and use it. Perceived usefulness from instructors' perspectives, at the same time, (i.e. educational performance enhances effectiveness, save time and efforts, enhance effectiveness, improve job performance, control over work) possibly will affect their action toward adopting and accepting e-learning system. On the contrary, Porter and Donthu [23] hypothesized that user might keep away from learning new technology because of the expected complexity and risk related to the new technology. Consequently, PEOU in e-learning systems (i.e. helpful guidance in performing tasks, easy to understand, less rigid, less frustrating, flexible, less mental effort) might influence Palestinian

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instructors' intention to adopt e-learning system. In this context of e-learning systems, the model suggests that higher level of PEOU and PU of LMS will enhance instructor's acceptance. Accordingly, the following hypotheses are proposed:

- H1a: PEOU has a positive effect on the PU of LMS.
- H1b: PEOU has a positive effect on LMS adoption.
- H2: PU has a positive effect on the actual LMS adoption.

4.2 Organizational Factors

Facilitating conditions

Facilitating conditions in this research have been defined by "the degree to which an instructor believes that an organizational and technical infrastructure exists to support the use of the system" [24]. Researchers have found many obstacles that prevented instructors from accepting online systems in teaching activities. Some of these included a lack of sufficient infrastructure [25].

Groves and Zemel [26] highlighted different kinds of supports (e.g. information or materials availability and administrative support) were considered as very significant variables by instructors, which affected their use of IT in teaching. In identifying the most critical variables that affect the instructors' adoption of LMS, Al-Shihi and Al-Busaidi [27] found that organizational factors including facilitating conditions have a strong relation with PEOU and PU of e-learning management systems and consequently the actual use of the systems. This factor has a positive relationship with PU and PEOU on the adoption and use of e-learning management systems. As a result, the following hypotheses proposed:

- H3a: Facilitating conditions have a positive influence on the PU of LMS.
- H3b: Facilitating conditions have a positive influence on the PEOU of LMS.
- H3c: Facilitating conditions have a positive influence on the actual adoption of LMS.

Top management support

Managerial support represented by senior managers plays a significant role in the success of any project. Top management can support, motivate and assist employees to adopt the newly implemented IS technology. Management support of end-users significantly improves computer usage. Venkatesh and Bala [28] demonstrated that it is more likely to assist the adoption of technology in question if an individual sense the presence of managerial and organizational support. literature has shown a considerable connection between top managerial support and the adoption of e-learning system [29]. Al-Busaidi and Al-Shihi [27] mentioned that PU and PEOU are strongly correlated with management support.

Likewise, it is normal that in the e-learning context, teachers who consider that they have administration support with respect to the execution of e-learning applications, which involves some shift and change in organization structure, will positively influence the adoption of LMS. And so, the next hypotheses are created:

- H4a: Top Management Support has a positive influence on the PU of LMS.
- H4b: Top Management Support has a positive influence on the PEOU of LMS.
- H4c: Top Management Support has a positive influence on the actual adoption of LMS.

4.3 Instructors' Factors

Resistance to change

Users' resistance to change behavior or attitude is considered a main factor that prevents organizations from wholly realizing the benefits of new IS technology. Users usually refuse to accept new information technology tools that have been accepted and employed by organization management. Bovey and Hede [30] argued that many large programs' shift failure is due to the employees not accepting to change.

Prior studies on e-learning system adoption attributed individuals' resistance to change as a significant reason for the limited adoption of these systems. According to [31], resistant to change is caused by instructors' unfavorable attitude toward innovation. Lecturers' resistance emerges to produce a negative behavior to their acceptance of LMS. It is therefore hypothesized:

- H5a: Instructors resistance to change has a negative effect on the PU and PEOU of LMS.

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- H5b: Instructors resistance to change has a negative effect on the actual adoption of LMS.

Computer self-efficacy

Computer efficacy relates to a judgment of the user's ability in using a computer. Compeau and Higgins [32] defined computer anxiety as "the degree of an individual's apprehension when she/he is faced with the possibility of using computers". Venkatesh[33] hypothesized that computer self-efficacy would lead instructors to form a positive behavior toward the acceptance of IT. In the e-learning environment, instructors with lack of knowledge and skills in using e-learning system would be more unwilling to accept it.

Previous literature has confirmed the significant role of computer knowledge and efficacy in understanding instructors' attitude toward IT. People with a limited computer self-efficacy will be simply disturbed by complications and will react by decreasing their perceptions of their potentials in accepting certain information technology. On the other hand, people with a good sense of computer self-efficacy will be more likely to overcome any obstacle that they confront and will not be discouraged easily by difficult problems [34]. Also, Gong et al., [35] proved that computer self-efficacy illustrated a strong positive influence on PEOU of LMS. So, lecturers with high computer self-efficacy are more probably able to adopt e-learning systems in their teaching. The more the lecturer is convinced in his or her capability to use e-learning system, the more he or she perceived that the LMS is easy to use. On the other hand, Findik and Ozkan [36] found that PU and self-efficacy are strongly related. Self-efficacy is believed to have a direct effect on instructor actual use of LMS [37]. The more confident an instructor is in using IS/IT, the more probably he/she will accept e-learning systems [38]. It is therefore hypothesized that:

- H6a**:** Self-efficacy has a positive effect on the PU of LMS.
- H6b**:** Self-efficacy has a positive effect on the PEOU of LMS.
- H6c. Self-efficacy has a positive effect on the actual adoption of LMS.

Personal IT innovativeness

In the e-learning context, IT innovativeness is related to an individual's attitude reflecting his willingness and capability to try out a new IS innovation independently [39]. Innovative people may realize the easiness and usefulness of new technology more quickly than non-innovative people. Al-Busaidi and Al-Shihi [27] hypothesized and empirically proved that the level of instructors IT innovativeness has a substantial positive effect on both PEOU and PU of LMS. Therefore, this study hypothesized that:

- H7a: Personal IT innovativeness has a positive effect on the PU of LMS.
- H7b: Personal IT innovativeness has a positive effect on the PEOU of LMS.
- H7c: Personnel IT innovativeness has a positive effect on the actual adoption of LMS.

Attitude toward system

Brown and Venkatesh [40] described attitude as "the individual's negative or positive feeling toward a specific subject behavior". A considerable amount of studies confirmed that attitude toward e-learning system might be valid factors to consider when adopting a new e-learning system [41]. Thus, understanding individuals' attitude toward e-learning systems is significant. According to [42], no matter how sophisticated e-learning system is, its efficient implementation is based upon users having a positive attitude toward the system. Therefore, instructors are expected to have a higher intention to accept and adopt LMS once their attitudes become more positive. In line with [43], e-learning systems' PEOU and PU appear to be positively affected by the attitude toward e-learning system. Based on Valentine [44], while lecturers have a fairly positive attitude toward the learning management system, they still also have a fairly negative attitude toward their own use of those systems. Based on this justification, it is hypothesized that:

- H8a: Attitude toward e-learning systems has a positive effect on the PU of LMS.
- H8b: Attitude toward e-learning systems has a positive effect on the PEOU of LMS.
- H8c: Attitude toward e-learning systems has a positive effect on the actual adoption of LMS.

4.4 Social factors

Subjective norms

Subjective norms as reported by Huang et al., [45] is related to an "individual's impression of normative beliefs and how most people who are important to him,/her think that he/she should or

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should not perform the behavior in question". Subjective norm is proposed to have a direct effect on LMS adoption. The reason is that individuals may decide to execute a task, regardless of the possibility that they are not themselves favorable toward the task or its results if they think one or more important referents believe they should and they are adequately inspired to follow the referents [46].

In the e-learning context, subjective norm influences the user's adoption of LMS. Wang and Wang [18] concluded in their research that subjective norm is a critical factor in LMS adoption among instructors. Various literature indicates that subjective norm has a direct connection with both PU and system use [47] in LMS context. After examining learners' acceptance of LMS, Park [48] discovered irrelevant influences of subjective norms on PEOU. The connection between subjective norms and PEOU and PU is analyzed in the study model. Considering the argument, the study hypothesized:

- H9a: Subjective norm has a positive effect on the PU of LMS.
- H9b: Subjective norm has a positive effect on the PEOU of LMS.
- H9c: Subjective norm has a positive effect on the actual adoption of LMS.

4.5 Technology/System Factors

System Quality

System quality is related to the functionality of the e-learning system [49]. Essentially, high levels of system quality can create an agreeable use condition where instructors can conveniently distinguish practical groups of the information system and adequately explore the materials that the system gives. This means that a better quality of LMS will have an optimistic impact on the entire LMS adoption [18]. In addition, Igbaria et al., [50] mentioned that system quality had an indirect impact on computer adoption via PU and PEOU. Systems with higher quality are more likely to be used.

The most commonly used variables of the system quality in the e-learning context include system accessibility, user-interface design, system response, and system interactivity [51]. System accessibility describes the perceived capability of an e-learning system to give flexible access to educational contents anytime and anywhere [52]. Instructors, therefore, perceive that LMS is easy to use after allowing better access to essential subject materials. System interactivity is related to the connections between students and lecturers, and among lecturers themselves [51]. Instructors can successfully communicate among themselves and with students via the e-learning management system once they perceived that the relationship is bi-directional [53]. Essentially, instructors who believe that LMS can quickly provide efficient communications between lecturers and students believe that LMS is an easy-to-use technology.

At the same time, the system response is described by Cheng [51] as "the degree to which an instructor perceives that the response from the e-learning system is fast, consistent and reasonable". Theoretically, the system will be considered easy to use and useful among instructors when instructors find that the LMS provide fast and consistent response time [52]. Furthermore, user-interface design plays a central role in influencing instructor's choice to use the system as well as their perceived PEOU and PU [54]. An appropriate control toolbar with apparent instruction can make instructors feel more comfortable and facilitate their use of LMS. Accordingly, the user interface design should be carefully considered in the development of the LMS. Therefore, the research hypotheses:

- H10a. System quality has a positive effect on the PU of LMS.
- H10b. System quality has a positive effect on the PEOU of LMS.
- H10c: System quality has a positive effect on instructors' actual adoption of LMS.

Information quality

DeLone and McLean [15] defined information quality as the output quality generated by an IS. Its measurement includes categories like timeliness, scope, relevance, efficiency, currency, completeness and accuracy of information. According to [55], information quality has significant positive impacts on the adoption and success of e-learning systems. Essentially, e-learning has more prominent interest to instructors as a result of the richness of contents given by LMS [56]. When compared with conventional teaching methods; the relevant, accurate, regularly updated and rich course contents provided by the web based learning management system may encourage teachers to believe that the system can be a helpful

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and beneficial method for learning [57]. In consonance with [58], If the web-based e-learning system content is organized and combined with high-quality figures and explicit text, lecturers will be easily capable of using the web-based instruction. In addition, providing instructors with consistent and precise information will persuade them to believe that LMS is easy to use.

Moreover, if instructors perceived that the content provided by the learning management system as appropriate to their demands, this can assist their positive flow experience for using the system. Conforming to [18] information system factors like information quality indirectly affect the actual adoption of LMS via PEOU and PU. The more relevant, timely and accurate the outcome of LMS is, the more the lecturers discover the system is easy to handle the required information. So, the following hypotheses are suggested:

- H11a: Information quality has a positive effect on instructors' PU of LMS.
- H11b: Information quality has a positive effect on instructors' PEOU of LMS.
- H11c: Information quality has a positive effect on instructors' actual adoption of LMS.

Service quality

Service quality indicates the overall IS support provided by the service provider including help desks, hotlines, online support services, and other types [59]. Roca et al., [60] evaluated service quality by indicators related to empathy, reliability, and responsiveness, which confirmed it's significant indirectly on PU. Thus, this research paper considers the service quality of technical support as the main measure in mapping instructors' attitude. Basically, both customized support and instructional help can make users perceive that a self-paced e-learning tool is an easy-to-use tool [61]. That is when universities can supply instructors with adequate service including competent technical service engineers and trained service coordinators which will make the LMS perceived as easy to use among instructors [62]. Accordingly, service quality can directly influence PEOU and PU [37]. For instance, the existence of training and efficiency and sufficiency of technical support has a positive effect on PEOU of LMS. Hence, this study hypothesizes that:

- H12a: Service quality has a positive effect on the PU of LMS.
- H12b: Service quality has a positive effect on the PEOU of LMS.
- H12c: Service quality has a positive effect on instructors' adoption of LMS.

4.6 Net Benefit

Studying the impact of IT on the organization and individual performance has become an essential factor in shaping the value of IS. Previous studies on IS adoption have recognized the contribution of the actual adoption of IS in enhancing the educational performance especially with regard to productivity, efficiency, and effectiveness [63]. In the same way, studies on e-learning systems discovered that at instructors' level, the systems could save time, provide easier learning and alternative teaching methods, improve user's output per unit of time, provide better collaboration and knowledge sharing, improve interaction, and increase access to information [64].

At the university level, e-learning system acceptance and adoption could increase the quality of teaching and learning and increase university competitiveness and reputation. Backing this point, Radović-Marković [65] mentioned that e-learning systems have enabled a higher degree of interactivity among professors and students and easier study material coverage in both undergraduate and graduate students that lead to information and knowledge expansion. E-learning systems could increase student enrollment so it could lower the average cost per course per student. At the same time, universities could save much money in employing many instructors to provide every kind of course in university and reduce their teaching load [47]. Similarly, Radović-Marković [65] "stated that educational institutions have made significant savings in terms of human and other resources utilization, and thereby have increased their profits after using and adopting e-learning systems". Also, Welsh et al., [66] emphasized that web-based e-learning system usage and adoption in the HEI will improve their performance, enhance employee satisfaction and increase innovativeness. Accordingly, this study hypothesized that:

- H13: LMS adoption positively related to higher educational performance (Net benefit).

5. RESEARCH METHODOLOGY

5.1 Sample Size and Unit of Analysis

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Since the primary purpose of this study is concerned with the perception of instructors about the adoption of e-learning systems, this study considered higher education instructors as the unit of analysis. However, the sampling method used is cluster random sampling. In cluster sampling, the population is divided into units or groups, called strata, and then a simple random selected from the population. Several rules of thumb for the minimum sample size of structural equation models have been proposed. A widely-accepted proportion of study sample size to estimated parameters is N:p = 5:1 [67, 68]. With a total of 72 elements, a total of 360 samples were required to achieve statistically significant results identified through the sampling procedure. Based on 580 questionnaires distributed to full-time and part-time instructors at the various universities and after excluding the invalid responses, 365 valid questionnaires were obtained. This resulted in a usable response rate of 62.06%.

5.2 Research instrument

The survey questionnaire is used as the major instrument in this study to inspect the research model. A five Likert-scale is used to represent the responses of the subject. The five-point Likert scale is preferred as it enables respondents answering the questions to understand better on what option they should choose for their answers hence improving answers quality [69]. Muries and Masele [6], further assert that for a larger study (N>100) a five-point Likert scale is preferable for better data distribution, flexibility, and ease of composition.

To create an efficient questionnaire, 72 items related to the selected dimensions in the research study model were adopted from empirically tested literature and refined accordingly to fit the topic in hand. In an attempt at accomplishing the objectives of the pilot study suggested by [70], a sum of 82 surveys was distributed evenly among instructors in various institutions. 40 surveys were returned yielding a response rate of 48.7%. Though, three surveys were found to be unusable as it was incomplete. Based on the usable questionnaires of the pilot study, the analysis was performed to test instrument reliability. To this end, Cronbach's alpha value was adopted. Cronbach's alpha is a measure that provides a reliability coefficient to indicate the internal consistency of the instrument and it ranges from completely unreliable (0) to perfectly reliable (1). Sekaran [71] describes that the closer Cronbach's Alpha to 1.00, the higher the reliability of the measure is. In this way of analysis, the items are considered highly reliable if the overall Cronbach's alpha coefficient of all the items of a construct is greater than 0.7 [72]. If an alpha is less than this value, it indicates that the items are unlikely to be reliably measuring the same thing. Most measures recorded Cronbach's alpha value greater than 0.88, suggesting that the measures are highly reliable. As a result, the questionnaire needed no more alteration to increase alpha coefficients.

6. DATA ANALYSIS AND RESULTS

Upon completion of the data collection, data analysis is started. However, prior to conducting the actual data analysis, preparatory procedures are to be undertaken as suggested by [73]. The procedure involves five phases of activities including deciding on a format, designing the code, coding, data entry and data cleaning or editing. Following the data preparatory procedures, data analysis is undertaken. After establishing the research design and data collection procedures, this section presents the data analysis tools and techniques adopted in this research study. To achieve research objectives, i.e. to identify and investigate the factors that affect the adoption of web-based learning management systems among instructors in Palestinian HEIs; the data analysis is divided into two stages. In the first stage, preliminary data analysis is performed with the help of SPSS. Findings generated at this stage of analysis provided the general picture of the respondent's demographic statistics and their response to the survey instrument. In the second stage, the evolution of structured model using SEM technique is employed with the help of AMOS. At this stage, interrelationships between multiple independent and dependent variables are examined to test the proposed hypothetical framework developed. In addition to this, both the measurement model and structural model analysis techniques are employed to identify the level of significance of various factors affecting the acceptance of LMS.

6.1 Demographics and descriptive Statistics

The demographic profile of the study population is presented in Table 1, where almost 74% of the participants were males and 26% were female. This is almost close to the pattern of gender composition of instructors in Palestinian

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universities. Additionally, 36.5% of the respondents were between 31 and 40 years old. More than 33% of the respondents were experienced instructors with more than 6 to 10 years of teaching experience. A result for age and academic position indicates that almost half of the participants are assistant professors (48.9%). One reason may account for this rank distribution patterns; promotion procedures, which often results in the delay of faculty members' promotion in most of the universities. It is likely that many faculty members were not satisfied with the promotion procedure in their universities resulting in the inability of some faculty members to meet the requirements of promotion.

Table 2 presents descriptive statistics for the factors in the model. Instructors, in general, had a positive impression on facilitating conditions, net benefit, service quality, system quality and information quality of LMS. They approximately had self-assurance in their own innovativeness and capabilities to adopt LMS. Additionally, instructors generally believed that resistant to change and management support affects the adoption of the system and LMSs were easy to use and useful and can deliver the net benefit. Majority of lecturers perceived substantial social pressure to adopt LMS. PU has the highest mean among the constructs (4.132) meaning that instructors believed the usefulness of the LMS adoption. However, the lowest mean (2.318) is related to management support which shows the lack of support.

Table 1: Demographic Statistics of The Respondents

Variable	Item	Frequency (N= 365)	Frequency (%)
Gender	Male	271	74.2
	Female	94	25.7
Age Group	> 30	34	9.3
	30-40	130	35.6
	41-45	128	35.06
	<50	73	20.0
Teaching experience	> 5	75	20.5
	6-10	120	32.8
	11-15	88	24.1
	<16	82	22.4
Academic Rank	Master	132	36.1
	Asst. Prof	176	48.2
	Assoc. Prof	36	9.8
	Full Prof	11	3.01
University Name	Polytechnic	52	14.2
	Hebron	57	15.6
	Birzeit	64	17.5
	Bethlehem	54	14.7
	An-Najah	71	19.4
	Al-Quds	67	18.3

Table 2: Descriptive Statistics of the Investigated Constructs

Construct	Mean	Std. Deviation
PU	4.132	0.89031
PEOU	3.096	0.84325
Actual Adoption	4.032	0.89299
Subjective Norms	3.359	0.75967
Facilitating Conditions	3.379	0.76136
Management Support	2.318	1.00000
Information Quality	3.697	0.83622
System Quality	3.128	0.87524
Service Quality	3.244	0.86672
Attitude toward System	3.311	0.91008
Personnel IT Innovativeness	4.020	1.33964
Self-Efficacy	3.742	0.92240
Resistant to Change	3.218	0.94132
Net Benefit	3.718	0.80454

6.2 Structural Equation Modelling

Structural equation modeling (SEM) was used to test the hypotheses. Based on [72], SEM helps researchers in examining the interrelationships among multiple variables simultaneously. Moreover, it is a powerful tool that offers precise statistical measures to handle thorny models. Usually, SEM is performed in a two-step approach, i.e. the measurement model also known as CFA and the structural model also known as path analysis. Measurement model assists in testing the convergent-discriminant validity of the constructs, while the structural model (SM) helps to identify the direct and indirect influence of one latent variable in the model.

6.3 Measurement Model

Cronbach's coefficient alpha reliability method was employed to measure the internal consistency of each measure. As presented in table 3, all value of Cronbach's α of the constructs found to be higher than the recommended level 0.7. Additionally, "deletion of any of the items would significantly decrease the Cronbach's alpha coefficients of the constructs. Therefore, no further changes were made.

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Table 3: Reliability Measures for the Measurement Model

Construct	α Alpha	N of Items
PU	0.840	6
PEOU	0.896	6
Actual Adoption	0.761	3
Subjective Norms	0.828	5
Facilitating Conditions	0.882	5
Management Support	0.908	4
Service Quality	0.869	5
System Quality	0.913	6
Information Quality	0.873	5
Attitude toward System	0.844	3
Personnel-IT Innovativeness	0.707	3
Self-Efficacy	0.929	5
Resistant to change	0.907	6
Net Benefit	0.911	6

CFA evaluated the measurement model in terms of goodness-of-fit (GOF), discriminant validity and convergent validity. To evaluate the total GOF of a model, seven mostly commonly employed model fit measured were used, such as the ratio of X^2 to degrees-of-freedom (d.f.), the root mean square error of approximation (RMSEA), the goodness-of-fit index (GFI), the norm fit index (NFI), Tucker-Lewis Index (TLI), the comparative fit index (CFI), and the adjusted goodness-of-fit index (AGFI). As shown in Table 4, GOF indices were categorised into three categories, i.e. parsimonious fit, incremental fit and absolute fit indices Results of initial CFA model lit indices (X2/df = 1.497, RMSEA = 0.037, NFI = 0.903, TLI = 0.927, CFI = 0.933, and AGFI = 0.802) found to be in acceptable limits. In addition to these GOF measures, the values of standard regression weights (factor loading) for all items found to be >0.7, standard residual values found within the acceptable limit (above 2.58 or below -2.58) and values of critical ratio found > 1.96. Consequently, based on all these satisfactory results, it was worth mentioning that the research model adequately fitted the data and no further re-specification and refinement was required.

Table4: Model Fit Indices for Cfa

Measure indices	Fit indices	Result	Criteria & Ref
Absolute fit measure	X2/Df	1.589	1< χ2/df<3 Hair et al [72]
	RMSEA	0.037	*<0.05* Bagozzi and Yi, [74]
Incremental fit measure	NFI	0.903	*≥ 0.90* Bentler & Bonett [75]
	TLI	0.927	*≥ 0.90*
	CFI	0.933	*≥ 0.90* Bagozzi & Yi [72]
Parsimony fit measure	AGFI	0.802	*≥ 0.80* Hair et al., (2006)

All model fit indices presented in Table 4 determined a sufficient measurement model. Consequently, the psychometric properties of the measurement model were measured in terms of its discriminant validity, convergent validity, and composite validity. Table 6 presents the results of the reliability coefficient for all the observed variables. Results indicated that reliability values for all constructs found above the recommended limit i.e. > 0.7 [72]. Based on Table 6, the values of the constructs reliabilities ranging from 0.762 subjective norms) to 0.929 (self-efficacy). These results indicated high internal consistency and strong reliability among all constructs of the measurement model. Convergent validity, on the other hand, is concerned with whether or not a set of items share a high proportion of common variance. In order to measure the convergent validity of each construct used in the proposed model, the researcher employed AVE, estimates of standardized factor loading and composite reliability (CR) estimation [76].

Table 5: Average Shared Variance and Average Variance Extracted Indicators

S.NO	Constructs	AVE	ASV	Composite Reliability
1	Net Benefit	0.632	0.063	0.911
2	System Quality	0.632	0.031	0.913
3	PEOU	0.593	0.098	0.897
4	PU	0.672	0.107	0.925
5	Facilitating Conditions	0.511	0.026	0.840
6	Self-Efficacy	0.685	0.012	0.929
7	Management Support	0.717	0.013	0.910
8	Service Quality	0.573	0.084	0.852
9	Information Quality	0.588	0.022	0.876
10	Subjective Norms	0.502	0.015	0.762
11	Resistance to Change	0.665	0.077	0.912
12	Actual System Use	0.661	0.031	0.852
13	Attitude toward System	0.681	0.007	0.865
14	Personnel IT Innovativeness	0.632	0.106	0.925

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Convergent validity, on the other hand, as indicators in measuring certain construct whether they share a high proportion of variance in common [72]. In order to measure the convergent validity of each construct used in the proposed model, the researcher employed AVE, estimates of standardized factor loading and composite reliability (CR) estimation [76]. The acceptable requirement for factor loadings is to be equivalent to or higher than 0.50 and 0.70 respectively, indicating that the items relate with their factor. On the other hand, discriminant validity is related to correlation among the factors. To be free from discriminant validity problems, all items should be loaded highly on one factor. It can be achieved when the square root of AVE is above the correlation with any other variable [77]. Additionally, another evidence of good discriminant validity is when AVE is greater than the Average Shared Variance (ASV) [76], and the square root of AVE is above the construct's correlation with other constructs [77]. The ASV and AVE indicators are presented in Table 5.

It is found that all factors loadings were higher than 0.70 thresholds as suggested. This is an indication of a good convergent validity. The values of AVE for all constructs ranged from 0.502 to 0.717, which exceed the minimum requirements of 0.50 is another evidence of good convergent validity. Likewise, the CR values for all constructs were well above the recommended level of 0.70, which also support the convergent validity. CR and Cronbach's α coefficient were the reliability indicators used. Therefore, both reliabilities were achieved as the alpha score (previously discussed) all are above 0.7, whereas CR scores were between 0.762 and 0.929, which suggests that there is a good internal consistency for all constructs. Regarding the discriminant validity, the square root of AVE was higher than the correlation of other constructs. Also, the values for AVE for all constructs were higher than the values of ASV. Therefore, this two validity evidence (convergent and discriminant) support the validity of the measures. This result suggests that the model has a sufficient degree of validity and reliability, allowing the analysis to carry on with the assessment of the structural model.

6.4 Structural Model

After the CFA validation, the next step of the analysis is to test the causal hypotheses presented in the proposed research model and the strengths of the relationships among the constructs with the help of a structural model. The researcher used GOF indices and examined other parameters estimates to evaluate the hypothesized structural model. Results of fit indices of the structural model are presented in table 6. The likelihood ratio chi-square ($\chi2$ = 3557.963; df = 2239; p = .000) was significant (p < .001); x2/df achieved an acceptable fit of 2.150 and found well within limits i.e. 1 < x2 / df < 3. Moreover, the results for TLI and CFI were 0.916 and 0.920respectively and were above the recommended value of ≥ 0.90. Similarly, the results of AGFI (8.01) met the recommended criteria of ≥ 0.80. Finally, the value of RMSEA also found within the recommended criteria of < 0.5 and achieved an acceptable figure of 0.040.

Table 6: Structural Model Fit Indices

Measure indices	Fit indices	Results	Criteria & Ref
Absolute fit measure	X2	3618.809	
	Df	2299	
	X2/Df	1.574	1< $\chi2$/df<3 Hair et al., [72]
	RMSEA	0.040	*<0.05* Bagozzi and Yi [74]
Incremental fit measure	NFI	1.000	*≥ 0.90* Bentler and Bonett [75]
	TLI	0.916	*≥ 0.90*
	CFI	0.920	*≥ 0.90* Bagozzi and Yi [72]
Parsimony fit measure	AGFI	0.801	Hair et al., [75]

This study's proposed structural model is found to be fit with the data as per the above table. Visually, the measurement model and structural model look similar but with little modification, the relationship between constructs now changes to one directional arrow representing dependence relationship. The fitness of the structural model needs to be analyzed through a similar process of achieving goodness of fit. It can be observed that the difference is quite negligible. The proposed structural model is presented in Figure 1. Another important part of the structural model assessment is coefficient parameter estimates. Research hypotheses were tested by analyzing the path significance of each relationship and parameter estimates were used to produce the estimated population covariance matrix for the structural model. To examine the hypotheses, critical ratios, standardized estimates and p-value were used.

It was assumed that a relationship is statistically significant at the 0.05 levels when the

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critical ratio (CR or t-value) found higher than ± 1.96 [72]. The casual paths were examined in the model based on the path estimates and CR (t-value). Results demonstrated that t-values for twenty-two causal paths estimate found above the 1.96 (critical value) and significant at $p \leq .05$. However, t-values for thirteen casual paths were found not statistically significant. Results show that out of thirty-three hypothesized paths between the variables, twenty-two were found to be significant. For example, the hypothesized path between actual values of twelve hypothesized paths between self-efficacy and AU; subjective norms and AU; service quality and AU; personnel IT innovativeness and AU; attitude toward system and AU; system quality and PU; subjective norms and PU; facilitating conditions and PU; self-efficacy and PU; resistant to change and PU; management support and PU; attitude toward system and PU; attitude toward system and PEOU indicated that t-value did not exceed the cut-off point (>± 1.96) and hence are statistically insignificant.

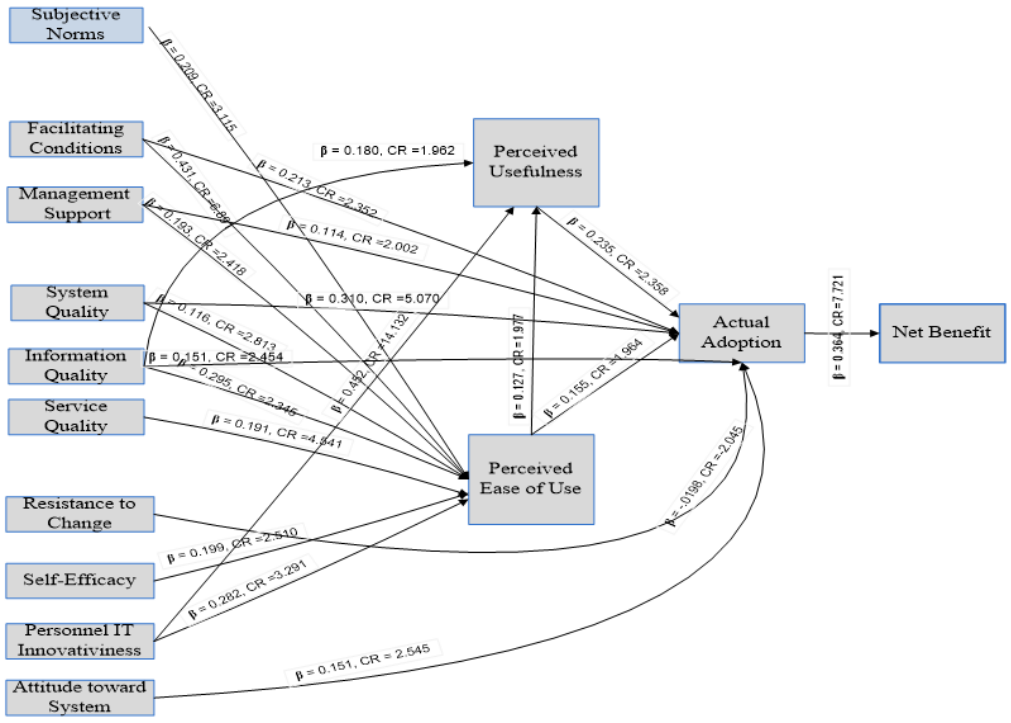

Figure 1: Structural Model

use (AU) and net benefit (NB) with a CR value of 7.721 (>± 1.96) was statistically significant (p = 0.001). Similarly, facilitating conditions and AU; information quality and AU; resistant to change and AU; management support and AU; system quality and AU; perceived usefulness and AU; perceived ease of use and AU; perceived usefulness and IM; perceived ease of use and PU; service quality and PU; information quality and PU; personnel IT innovativeness and PU; system quality and PEOU; management support and PEOU; service quality and PEOU; resistance to change and PEOU; subjective norms and PEOU; information quality and PEOU; facilitating conditions and PEOU; self-efficacy and PEOU. For personnel IT innovativeness and PEOU, the hypothesis was statistically significant at p = < 0.05. Whereas, the

7. DISCUSSION

This research pointed out that facilitating conditions, management support, self-efficacy, personal IT innovativeness, information quality, service quality and subjective all improved lecturers' PEOU of LMS. However, the effect of facilitating conditions was greater than the other constructs. These results reflected that high facilitating conditions would increase users' beliefs toward the acceptance of LMS through the mediating impact of its PEOU. This significant of facilitating conditions dictating ease of use to adopt LMS substantiates previous finding [9]. In other words, it can be asserted that facilitating conditions such as infrastructure, technical support and training existence will support the adoption of LMS

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in Palestinian HEIs. Conclusively, the availability of sufficient facilitating condition will encourage the instructors to have a positive attitude toward LMS. After facilitating conditions, the impact of information quality was more than the other factors. This significant impact of information quality dictating ease of use to accept and adopt LMS substantiates previous findings [51].

These results further demonstrated that instructors get socially motivated to consider LMS ease of use when they see their colleagues or students use the LMS and thus recommend them to use it. These findings are in accordance with the findings of other studies [78, 79]. It is noteworthy to mention that Findik and Ozkan [36] study o found that subjective norm was positively correlated with PEOU. Based on this evidence it can reasonably be concluded that instructors' belief about the ease of use of LMS is significantly influenced by the social influence represented by subjective norms. Based on this evidence, it can reasonably be concluded that instructor's belief on LMS ease of use is significantly influenced by the social factors.

In addition, findings show that among all factors, only information quality and personal IT innovativeness enhanced lecturers' PU of LMS. Information quality as part of system and technology factors is a strong predictor of PU to adopt LMS. This result demonstrates that if instructors perceive the LMS has readable, reliable, updated, accurate and well-formatted course contents, they will find the LMS more useful for their instruction activities which are consistent with [51, 55]. However, instructors' IT innovativeness influenced PU more than information quality did. It can reasonably be concluded that instructors' beliefs about the usefulness of LMS are significantly influenced by their personnel IT innovativeness. These results are in accordance with the findings of other research studies [39, 80-83].

The results of the study did not support the direct effect of facilitating conditions, management support, resistance to change, self-efficacy, attitude toward the system, subjective norms, service quality and system quality on instructors' PU of LMS. In contrast to information quality, system quality had no direct influence on PU which is consistent with [18, 37, 84]. The influence of system quality might be considered vital throughout the early implementation but will reduce over time. Thus, it is significant for the lecturers to obtain helpful information from LMS since PU depends on the LMS output quality rather than system performance.

The evidence from these results is the fact that PU of web-based learning management system is considerably influenced by its ease of use which may further affect its adoption to achieve the net benefit for higher education. Similar to the findings of this research study, empirical findings of many previous research studies in similar context also found a positive correlation between these constructs [9, 13, 18, 36, 51, 85-93].

Furthermore, based on research results, PEO, PU, facilitating conditions, management support, system quality, information quality, resistant to change and attitude toward system all had a direct influence on instructors' use of LMS. However, system quality was the most significant construct for determining the adoption of LMS. The direct positive influence of system quality on actual use of LMS was consistent with the results of [37] and [94]. In brief, system quality was found to have a significant positive direct relationship with actual system use and indirect relationship on actual LMS adoption mediated through PEOU. In contrast with service quality, the findings suggested that service quality is not a direct fundamental determinant of LMS adoption. The findings also indicated that instructor's adoption and acceptance of LMS would enhance higher education performance. In a nutshell, higher education improvement and enhancement in Palestine is strongly based on the actual use and adoption of LMS by instructors.

All over, the findings of this research indicated that facilitating conditions, management support, self-efficacy, personal IT innovativeness, subjective norms, system quality, information quality, and service quality increased instructors' PEOU of web-based learning systems. Nevertheless, the influence of facilitating conditions ($\beta = 0.432$) was the most compared with the other factors. This result emphasizes the significance of technical support, infrastructure and training in accepting web-based learning systems. After facilitating conditions, information quality affected PEOU more than the other factors. For instance, the accuracy of information provided, sufficiency and updated information have a positive influence on instructors' PEOU. This highlights the importance of relevance, format, availability, timeliness, easiness, security and completeness of course contents distributed via the LMS so that

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instructors can save their time and efforts in using LMS. At the same time, the findings pointed out that facilitating conditions, personnel IT innovativeness, service quality, and information quality all improved instructors' PU of LMS. However, the influence of personal IT innovativeness (β = 0.452) was more than other factors. As a result, policymakers and managers of e-learning in educational institutions (particularly in Palestine) should pay special attention to factors which have a determining role in improving teaching performance and increasing instructors' efficiency in design and implementation process of a successful web-based learning system which should be adopted by university instructors.

Results of this study present several theoretical and methodological contributions. The study has extended the body of knowledge to innovation adoption and IS literature related to acceptance and adoption of e-learning systems, especially in the context of developing countries by constructing a theoretical model introducing new constructs. It is, therefore, able to enrich the understanding and extend the knowledge related to the e-learning and IS in the era of rapidly changing new technologies. Moreover, this research has evaluated and examined the viability of different theories and concepts of innovation adoption and diffusion which were established for developed countries to understand similar issues in the context of developing countries. The applied theoretical framework was established based on a thorough literature review to develop a big picture of the technology adoption research. The study also contributes to the IS success theory, providing the fact that learners as an individual need to be given a lot of consideration while developing a system. It is also for the system that will revolve around them and are the best to determine the success of the system.

The findings of this research have also several implications for decision-makers and scholars in the areas of IS quality and IS technology. The current research findings can assist university administrators and decision-makers to determine the necessary steps needed to facilitate and increase the use of LMS by faculty members and students. This research recommends university administrator and decision-makers to take advantage of the current study findings to implement an initiative across the university to educate the end users (i.e., faculty members and students) on the advantages of applying LMS and its positive impact on teaching and learning in higher education. Universities should train their lecturers to use the computer and its programs effectively to encourage them to use elevate using the computer when performing specific tasks or jobs. This would enhance their beliefs that organizational and technical resources exist to support the use e-learning system. Universities management should commit to a successful implementation and use of e-Learning in the universities which are the weakest in the field of management support. Universities should mitigate the invoke a passive reaction of the lecturers toward e-learning and should ensure that lecturers received an adequate training to handle the organizational and technical resources for use in e-learning at universities.

8. CONCLUSION

This study investigated factors that can potentially contribute to Learning Management System adoption in Palestinian Institutions of Higher Education. In addition, the study also developed an integrated model of instructors' adoption of LMS by incorporating IS literature and different empirically confirmed theories, TAM, and D& M IS success model. A multidimensional study model has been introduced based on the main categories which include technological, social, individual, belief, and organizational to classify the influence of the main factors on systems adoption among instructors.

As with all other empirical research, this study has its limitations. First, the reliability of the questionnaire data is dependent on the instructors' honesty as the data collected was self-reported by instructors. Additionally, the data for this research was collected under voluntary settings, which might not be the best condition for the respondents. Therefore, the findings may not be generalized to mandatory settings. Finally, the findings of this research might not be generalized to LMS adoption in a different context since this empirical research meant to investigate instructors' adoption of LMS in higher educational institutions. Nevertheless, there is still an opportunity for improvement. The proposed model is an unaltered model and can be further modified and investigated. Future researches can expand this model by adding some other factors and variables applicable to a different educational level such as schools.

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