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INTERVENTIONAL FACTORS AFFECTING INSTRUCTORS ADOPTION OF E-LEARNING SYSTEM: A CASE STUDY OF PALESTINE

[1]Fareed Al-Sayyed, [2]Baker Abdalhaq
[1]Department of Engineering Management, An-Najah National University, Nablus, Palestine
[2]Department of Computerized Information System, An-Najah National University, Nablus, Palestine
E-mail: [1]fareed_press@hotmail.com, [2]baker.abdalhaq@gmail.com

ABSTRACT

The main questions addressed in this paper are the following: what are the interventional factors that affect instructors' adoption of an e-Learning system and what are the relationships among these factors?. For this purpose a number of hypotheses were formulated. In this study, a framework was conceptualized based on an extended version of the Technology Acceptance Model (TAM) integrated with intervention factors. The findings of the study show that there is a significant positive relationship between management support, design characteristics, organizational support, training, perceived usefulness, perceived ease of use and intention to adopt e-Learning. Based on the study results, it was recommended that the Palestinian universities should intervene to promote the adoption of e-Learning system.

Keywords: *e-Learning, e-Learning adoption; Interventions; Technology Acceptance Model (TAM); Structural Equation Modeling (SEM)*

1. INTRODUCTION

Electronic learning is one of the most important outcomes of technological revolution, which driven by the internet transformation. With the rapid growth of e-Learning market worldwide rated at 35.6% [1], and due to growth rate with 8.2% of revenues for Self-paced e-Learning products in the Middle East which reached $378.4 million in 2011, and forecasted to reach $560.7 million by 2016 [2], it is clearly indicated that e-Learning is emerging as a new paradigm for educational perform in the world in general and in Palestine in particular. Therefore, there is a need to identify what drives a successful e-Learning deployment in universities of Palestine.

Investment in e-Learning systems loses its significance if there were inappropriate number of users. Therefore, it is necessary to study the impact of institutional interventions on instructors' behavior toward the adoption of e-Learning system in order to help executives to make polices based on individual characters and environmental factors that promoting teachers to use e-Learning [3].

Jasperson et al. [4], argued that managers should develop effective interventions from managers that can lead to greater new technology acceptance. For that, there is a need to grasp how various interventions can affect the determinants of e-Learning adoption.

The main objective of this paper is to investigate the interventional factors that affect the adoption of e-Learning in Palestinian educational setting based on an extension of Technology Acceptance Model (TAM) [5]. More specifically, this paper intends to develop a framework for e-Learning adoption for faculty members in Palestinian universities.

2. REVIEW OF RELATED LITERATURE

In order to address the primary research question, literature has been reviewed that is related to both theory of TAM and institutional intervene factors which influencing the e-Learning adoption. The following sections provide some background on these interventional and TAM factors.

2.1. Interventional Factors Influencing e-Learning Adoption

Interventions are classified into two main categories that are pre- and post-implementation [6]. Pre-implementation represents early stages that drive the actual roll related to initiation, adoption and adaptation of new system; whereas post-implementation represents the entails stages related to user acceptance, routinization, and infusion

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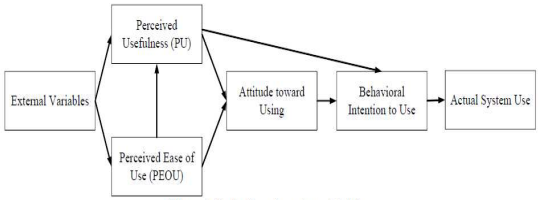
which follows the deployment of the new system [7].

Pre-implementation interventions described as a set of organizational activities such as management support, design characteristics, and user participation, that carried out during the development and deployment of new system [6].

Post-implementation interventions represent a group of institutional support activities such as: organizational support, peer support, and training which take place after the application of the new system in order to improve the acceptability of this system to the users [6].

2.2. TAM (Technology Acceptance Model) Factors

The Technology Acceptance Model TAM (Figure 1) which was developed by Davis [5], is an adaptation of TRA which was developed by Fishbein and Ajzen [8]. TAM is considered to be "one of the most influential research models in studies of the determinants of information systems (IS) and information technology (IT) acceptance to predict intention to use and acceptance of IS and IT by individuals"[9]. So, TAM has been employed in various information system areas.



Fige. 1: Technology Acceptance Model, [9].

In this model, there are two main determinants or factors that positively affect behavioral intention to use the new technology system. Behavioral intention is defined as "a measure of the strength of one's intention to perform a specified behavior" [8]. That mean, an individual's feelings toward performing the target behavior [9][10]. There are several factors such as perceived usefulness, and perceived ease of use [5] that are positively associated with behavioral intention [11].

2.3. E-Learning Discussion

2.3.1 The subject of e-Learning

A combination of 'e' and 'Learning' created the term e-Learning, that many scholars' efforts have been made to define. There are many definitions of e-Learning already exist in the literature.

Hambrecht [12] considered the e-Learning as a general term that includes a wide range of ICT's technological applications and processes which include education by a computer, web, digital collaboration, and networking. And Hedge and Hayward [13], considered that e-Learning as an innovative approach utilizing the digital technologies and internet to deliver to any learner electronically interactive learning environment at any place and time.

Triacca et al. [14], pointed that e-Learning was a type of learning online. And according to the other researchers the definition of e-Learning includes utilizing audio and videotape, interactive TV, and satellite broadcast [15], besides the instrumental methods introduced and delivered via internet, intranet, CD-ROM [16], and satellite TV [17].

Therefore, appeared synonyms for E-learning term such as computer-assisted learning, web-based learning, online learning, virtual learning, distance learning [18][14], and virtual classrooms [19], etc. These terminologies make it hard to achieve generic term for the e-Learning definition [20].

2.3.2 A categories of e-Learning

The use of e-Learning is mutually in a wide variety of contexts based on the nature of institutions. For example, e-Learning usage in commercial firms refers to the training courses that delivered to firm employees via their network as an innovative strategy. But, in distance education universities such as Al-Quds Open University in Palestine, it refers to the reaching learners at a distance by utilizing a wide spectrum of internet technologies. Recently in most universities, the use of e-Learning as a specific mode to attend a programs or a courses of study for the students interested in studying and accessing educational facilities on-line [21].

E-learning whether known as web-based, online, or distance learning have synchronous or asynchronous activates [22][23]. Synchronous e-Learning requires all participants, whether learners and instructors at different locations interacting simultaneously so that each learner is expected to receive instructions at the same time [22]. While asynchronous e-Learning occurs asynchronously according to time and place [24]. So, this type of learning lets learners and instructors participate their idea in the exchange of information without relying on the involvement of the other participants simultaneously.

When integrating online learning, whether synchronous or asynchronous with traditional face-

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to-face learning in classroom that delivered blended [17][25], hybrid, or mixed mode of learning [25].

2.3.3 E-Learning benefits:

E-learning cause changes in the economical, organizational and technical levels, especially in institutions of higher education. And practical experience has shown that the education process used in many of the institutions that used e-Learning technology in different ways, have resulted in different education quantity and quality [26].

There is a great interest in e-Learning technology at both academic and business field, and there is a concentrate on developing of e-Learning platforms in different countries [3]. One of these countries Palestine, represented by its university, in order to overcome a lot of challenges that face educational process, and keep up the great technological development which left a gap between the traditional system and the system that based on sharing knowledge as a specialists in the field of e-learning pointed out in these universities.

Over the time information technology has become strong, and heavily penetrated in academic activities in higher education due to the development of their ease of use. And teaching methods have been strengthened using the internet and web based on the forums [27].

E-Leaning caused a coup in education for being exposed a solution to time, distance, and education gaps besides the cost problems [28]. Qureshi et al. [27] based on literature review presented some benefits of e-Learning that are: the accessibility to educational material when needed, the low delivery cost of educational materials that are developed and uploaded online, the bridging the gap between theory and practice, the deep learning, the shared learning among learners from diverse backgrounds.

2.3.4 E-Learning challenges:

Andersson and Grönlund [29], conducted research on the critical challenges facing the e-Learning that valid for both developing and developed countries, with a particular focus on developing countries in their studies. In their research, they found 278 papers in the literature review describing the challenges facing the implementation of e-Learning in developing countries. After these papers were subjected to best quality, they have been reduced to 60 papers on the basis of the exclusion and inclusion criteria. Then 30 specific challenges have been identified and grouped into 4 categories that are: course design, individuals' characteristics, technological challenges, and contextual factors. Accordance to this study, developing countries focuses on design characteristics, organizational support, training the staff, and other contextual factors, more than focusing on individual characteristics when compared with developed countries as shown in Table 1. This is what the focus of universities in Palestine which is one of the developing countries, as argued the experts in the field of e-learning in those universities.

Table 1:E-Learning challenges according to Andersson and Grönlund [29]

Cat.	Research Focus (4)	Challenges (30)	Developed Countries	Developing Countries
1	**Course**	**Course design** • Curriculum / • Pedagogical model / • Subject content / • Learning Activities • Localization / • Flexibility **Support provided** • Support for students • Support for faculty	17	**23**
2	**Individual Characteristics**	**Student** •Motivation/ * Age •Conflicting priorities / •Gender /•Economy / • •Academic confidence / •Technological confidence • Social support **Teacher** •Technological confidence •Motivation and commitment •Qualification •Time	26	6
3	**Technological**	•Access/ • Cost / •Localization •Software and interface design	7	**18**
4	**Contextual Factors**	**Organizational** • Knowledge manage • Economy and funding • Training of teachers **Societal/Cultural** • Role of teacher and student • Attitudes on e-learning and IT • Rules and regulations	2	**21**

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2.4. Information and Communication Technology (ICT) in Learning Sector:

In the recent years, there has been an interesting to utilize computers, internet and communication networks that abolish the constraints of time and distances in the way that made the world as a small village. In light of this, there is a determined effort to recruit ITC's tools in the educational process in order to increase their efficiency and effectiveness in both formal and non-formal settings at all levels.

UNDP in 2005[30] defined ICTs as a set of tools, applications, goods, and services, on which information handled, produced, processed, stored, or exchanged. Mikre [31] refers the operational definition of ICT "to the computer and internet connections used to handle and communicate information for learning purpose". So, the effective delivering knowledge in the recent years based on utilizing e-Learning as ICT tool [22].

Noor-Ul-Amin in 2013 [32] differentiated between ICTs for education which refers to the enhancement of communication and information technology to serve teaching and learning objectives, and ICTs in education which includes the adoption main components of communication and information technology in the process of teaching and learning that related to (quality, accessibility, motivation, environment, ICT usage, and academic performance).

Tinio [33] pointed to the impact of growing capabilities of ICTs in the intension opportunities of enhancing the education's relevance and quality in developing countries; and as well facilitating knowledge acquisition and absorption. As Mikre [31] sees that many of the studies demonstrate the higher knowledge gained by learners when using ICT tools compared to those do not use.

So, in developing countries as UNDP [30] suggested, policies makers must recognize the need for linking ICT to education policies which should focus on new effective and flexible teaching paradigms that could be offered by ICT, subjecting teachers to re-training programs includes using ICTs in education, the need for local education content, the need for ICT infrastructure, and on using alternative technologies that are low cost and compensate the lack factors in education.

Voogt [34] described the basic roles of ICT's relevance in education as an object for study, a medium of instruction, and an aside of profession. In addition he distinguished between traditional learning and emerging pedagogy which based on constructivist approaches that fits to the use of computer and internet. These comparisons listed in Table 2 below.

Table 2: Overview of Pedagogy in the Traditional versus Information Society As adapted by Voogt [34].

Aspect	Traditional pedagogy	Emerging pedagogy
Active learning	Activities prescribed by teacher	Activities determined by learners
	Whole class instruction	Small group
	Little variation activities	Many different activities
	Pace determined by the programme	Pace determined by learners
Collaborative	Individual	Working in teams
	Homogenous groups	Heterogeneous groups
	Every one for him/herself	Supporting each other
Creative	Reproductive learning	Productive learning
	Apply known solutions to problems	Find new solutions to problems
Integrative	No link between theory and practice	Integrating theory and practice
	Separate subjects	integration between subjects
	Discipline based	Thematic
	Individual teachers	Teams of teachers
Integrative	Traditional pedagogy	Emerging pedagogy for the information society

Scheuermann and Pedró [35] urged many seasons pushed most countries to undertake considerable investments to develop technology employment in education, one of this important reason is the possess ability to fully integrate the knowledge economy driven by technology with society. In addition, ICT enable wider learners accessing to the same best practices education and course material regardless of geographical barriers and time, which have an impact on learners performance [32] and prepare them for the new global economy [36].

If we extrapolate the reality, find that the role of ICT in education will grow and develop continuously, because it becomes more important in all aspects of the life and the world engaging rapidly into digital media and information.

2.4.1 Palestinian's ICT background:

The Palestinian's ICT sector potentially contributes significantly to the development of Palestinian economy due to their great growth in the

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recent four years. According to Solutions For Development Consulting Co. in 2013 [37], ICT sector employs 3% of workforce whom producing 8% of Palestinian GDP.

The reports of Solutions For Development Consulting Co. in 2013 [37], revealed that the Palestinian capabilities in the ICT sector not only harnessed locally, but also international market access in Europe, USA, North Africa, and Middle East, by enhancing export and supply some competitively experiences, services, or solutions with high quality standers. Many celebrated international firms include Cisco, Intel, Volvo, and Siemens [38].

These capabilities such as: micro processors and software development, business process outsourcing, staff augmentation, ERP customization, mobile applications, banking software, telemedicine, finance and accounting services, HR services [38]; enterprise resource management, school management, data warehousing, courts automation, telecommunications, internet solutions, portals, and archiving [39].

According to some statistical indicators, the outlook for the Palestinian ICT sector is promising trend. Statistics shows that:

- Approximately, 1500-1600 students specializing in ICT fields graduated from Palestinian's Universities yearly [39].
- Approximately, 1512273 from 2622544 citizens access to internet in Palestine (West Bank), that representing 57.7% of Palestinian population, and 1.7% of Middle East population [40].
- Percentage of enterprises used computer in 2011 was 49.6% in West Bank, and 40.8% in Gaza strip [41].
- Percentage of households own computer in 2013 was 54.1% in West Bank, and 43.5% in Gaza strip [41]. In 2011 the average became 50.9%, and in 2006 became 32.8% [42].
- Percentage of households had internet at home in 2013 was 39.5% in West Bank, and 28.3% in Gaza strip [41]. In 2011 the average became 30.4%, and in 2006 became 15.9% [42].
- Percentage of households have mobile in 2013 was 96% in West Bank, and 97.1% in Gaza strip [41]. In 2011 the average became 95%, and in 2006 became 81% [42].
- Percentage of more than 10 years Palestinian's individuals used computer in 2011 was 53.7%, distributed as 54.8% in West Bank and 51.7% in Gaza strip [43].
- Percentage of establishments' employees who used computer in 2011 was 52.6% in West Bank, and 31.7% in Gaza strip [44].

Although, the ICT sector in Palestine growing and increasingly contributes well in Palestinian's GDP, but it still faces many challenges. The major challenges that Palestinian ICT firms faced are: skill set availability, limited market, political environment, poor ICT infrastructure, lack of funds, investment and regulations, competition, import restrictions, lack of innovation and focus, restrictions on movement of people and goods [38], limited telecommunications infrastructure, absence intellectual property law, and brain drain phenomenon [39].

AVASANT [38] analyzed the demand for ICT services based on the trade in various sectors; found that ICT services wide engaging with higher education sector, government sector, municipalities sector, tourism sector, commercial agribusiness, banking and financial services, and other professional services.

Therefore, it was necessary to study how to use ICT and IT in education process, and the achievement of its acceptance by users, in order to improve the quality of education and to share knowledge locally and globally after the world has become a small village due to the huge technological development.

2.4.2 : Palestinian universities and what domestic ICT promised.

Higher education and universities are intending and planning to acquisition several of ICT firm's services in the foreseeable future according to AVASANT [38] final report such as: enterprise resource planning (ERP), document and content management systems, e-Learning systems, VoIP and network solutions, broadband internet, telecommunication solutions, mobile applications, storage, servers, and databases.

Computer science courses that related to ICT fields, in 2011 accounted 3.74% of the total enrolments among all subject according to the Ministry of Education and Higher Education, that's contributes to the sustainability and growth of ICT industry [38].

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Wihaidi [45] pointed that there are many Palestinian specialists in diverse software-based ICT technical skills ordered from top as follow: MS Windows (53.5%), HTML (42.1%), C++ (42.1%), Oracle (37.8%), Java (35.4), Linux (29.2), Router Configuration, MySQL, Cisco, .NET, XML, C#, PHP, ISP, Shell Scripting, Novell, J2EE, Cobra, SAP, Mainframe, and COM/DCOM. These experiences could meet the various domestic and international markets demands.

2.4.3 Higher Education Sector in Palestine:

Educational system in Palestine faced many challenges due to the ongoing Palestinian and Israeli conflict, which represented in frequent closure and mobility restrictions; checkpoint barriers set up by the occupation army that separates teachers and students from their education institutions [46]; the establishment of Israeli settlements in the vicinity of Palestinian towns and villages; and the built of apartheid wall by Israelis which surrounds all governorates in Occupied Palestinian Territories and had a negative impact on the Palestinian economy and its institutions, whether educational or commercial ones.

The total number of students in Palestinian universities increased from 185011 in 2009/2010 to 201308 in 2012/2013, as shown in Table 3 below. Besides that, the teaching Staff at these Universities increased from 5557 in 2009/2010 to 6641 in 2012/2013 [43]. This is an indication of the annual increase in the number of lecturers as well as students in proportion with the increase in population, which calls for future expansion or increase the number of these universities.

Table 3: Higher Education Indicators in Palestine, 2009/2010-2012/2013 [43]

indicator	Scholastic Year			
	2009/ 2010	2010/ 2011	2011/ 2011	2012/ 2013
University Students*				
Males	79,047	84,501	85,190	81,052
Females	105,964	116,888	119,930	120,256
Both Sexes	**185,011**	**201,389**	**205,120**	**201,308**
University Graduates*				
Males	11,582	12,075	13,058	…
Females	17,171	18,161	19,493	…
Both Sexes	**28,753**	**30,236**	**32,551**	**…**
Teaching Staff at Universities**				
Males	4,598	5,204	5,340	5,309
Females	959	1,198	1,285	1,332
Both Sexes	**5,557**	**6,402**	**6,625**	**6,641**

*University data include students and graduates.
** Full time and part time.

Higher education in Palestine includes 53 accredited institutions in the West Bank and Gaza Strip, distributed as follows: 14 traditional universities, 1 Open University, 18 university colleges, and 20 community colleges [64]. At the university level, bachelor's degree duration at least four years. But at postgraduate level which leading to a higher diploma, a master's, or a doctorate degree programmes, the duration of these studies are normally two years at least to complete [27].

UNESCO in 2011 [27], wrote in their report a review of the main objectives of the Ministry of Education and Higher Education in Palestine that concerning with laws and basic regulations on education, structure and organization of education, administration and management of education, and the education process.

2.4.4 E-Learning Technology in Palestine:

Solutions For Development Consulting Co. [37], suggested in their report's recommendation to promote the ICT application usage in the system of basic education through collaboration of academic higher education institutions with private investments.

Shraim [53] reported that a research finding shows the positive attitudes of Palestinians higher education instructors to proceed to the e-Learning initiative. Added Shraim [53], to enable them to make full use of possibilities of e-Learning great efforts should be made.

E-Learning in the Palestinian higher education sector is growing rapidly, so that most Palestinian universities offer different forms of online education [53][48].

2.5. Structural Equation Modeling (SEM)

SEM widely used in the behavioral sciences as comprehensive statistical technique to testing hypothesis about directional and non-directional relationships among latent (unobserved) and observed variables [49]. Observable (measured) variables represent the sets of responses to the survey questions, while latent variables (factors) estimated from observed variables.

The main purposes of SEM are to obtain estimates of the model parameters, and to assess whether the model provides a good fit to the data.

2.6. International Studies

There are many studies conducted in different countries to assess the new or innovative technology acceptance in general, and studies on the critical factors influenced adoption of e-

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Learning technology, whether in institutions or universities.

Phua et al. [50], provided some baseline information about the factors influencing the behavioural intention of teachers within 10 districts in the state of Selangor to use the internet as a teaching-learning tool in home economics, based on TAM.

Farahat [51], introduced a conceptual framework based on updating TAM model, in order to examine and identify the factors affecting students' behavioral intention to learn online in Egyptian Universities.

Asiri et al. [52], presented a theoretical framework based on TRA and TAM, to examine factors that influence the attitude of Saudi Arabian faculty members towards using of the Jusur Learning Management System (Jusur LMS) one of the e-Learning management tools used in public universities.

Shraim [53], investigated the factors affecting academic staff towards the adoption of e-Learning Paradigm by conducting a semi-structured interviews with different teaching staff at Birzeit University, from a cross section of different academic departments. In this research, the proposed model was based on TAM model which developed by integrating with (social/individual characteristics and technological factors, and organizational/ contextual factors).

From these researches and studies that are based on different models for technology acceptance, which presented a framework suited the nature of a particular country, we can develop and implement a comprehensive framework suited to Palestinian universities to accept e-Learning by lecturers.

3. RESEARCH MODEL AND HYPOTHESES DEVELOPMENT

The proposed model is presented in figure 2. This model based on TAM factors which have been investigated by many of IS researchers who were agreed on its validity in predicting the users' intention towards adopt various systems [54]. In addition, the TAM was extended to investigate the affect of intervention factors, on predicting the perceived ease of use and perceived usefulness.

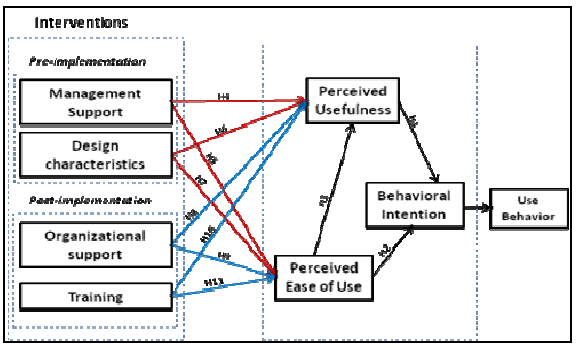

Fig. 2: Research Model

3.1. Perceived Ease of Use and Perceived Usefulness

Perceived ease of use, is defined as "the degree to which a person believes that using an IT will be free of effort" [10]. To understand the determinants of perceived ease of use of any system-specific or technology, Venkatesh [11] explored how user's perceptions formed and changed over time along with growing expertise with the target system. Theoretically, perceived ease of use is closely related to individual's self-efficacy based on hands-on experience and execution of skills.

Perceived usefulness is another important factor that influences lecturer's adoption of new technology which is defined as "the extent to which a person believes that using the system will enhance his or her job performance" [55].

Several studies were employed different measures to investigate the relationship among TAM factors [50] [6][55][54][11], and find that perceived ease of use and perceived usefulness have a close correlation with behavioral intention to use any new technology, and find that perceived ease of use has a close correlation with perceived usefulness. Hence the following hypotheses were developed:

Hypothesis 1: Perceived usefulness will positively affect instructor's behavioral intention to adopt and use e-Learning.

Hypothesis 2: Perceived ease of use will positively affect instructor's behavioral intention to adopt and use e-Learning.

Hypothesis 3: Perceived ease of use will positively affect instructor's perceived usefulness of using e-Learning.

3.2. Management Support

Management support suggested to be as a significant of information technology

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implementation success[56], and suggested to be one of the most critical success factors for the complex systems [56].

This factor refers to "the degree to which an individual believes that management has committed to the successful implementation and use of a system" [6]. So, managers such as: middle managers, senior executives, or direct supervisors are considered to be as significant sources of interventions who can intervene directly by using features of IT, incentive structures, or directing enhancement of new system applications; or indirectly by providing resources, sponsoring, or issuing guidance and directives [4][57].

Accordingly, the instructors who belief that they will gain management support pre-implementation of e-Learning system, which needs development in educational roles and universities structures, they will have a positive influence on the adoption of e-Learning system. Hence the following hypotheses were developed:

Hypothesis 4: Management support will positively affect instructor's perceived usefulness of using e-Learning system.

Hypothesis 5: Perceived usefulness will positively affect instructor's perceived ease of using e-Learning system.

3.3. Design Characteristics

Design characteristics can be categorized into information-related characteristics such as: accuracy, currency, completeness, and personalization, or system-related characteristics such as: accessibility, reliability, flexibility, adaptability, usability, and interactivity [59] [58][6].

Accordingly, the design features of the e-Learning system can positively influence instructors' perceptions about the ease of use and the usefulness of the system. Hence the following hypotheses were developed:

Hypothesis 6: Design characteristics will positively affect instructor's perceived usefulness of using e-Learning system.

Hypothesis 7: Design characteristics will positively affect instructor's perceived ease of using e-Learning system.

3.4. Organizational Support

Organizational support constitutes institutional activities or functions whether they are formal or informal that assist users in the new system usage in various forms [6]. As well, organizational support refers to procedures, practices, and policies that explore the importance of efforts related to training and development, such as reward systems [57].

In accordance with [6][40][60] studies, there is a positive effect of facilitating condition, post-implementation e-Learning system, on instructors' perceptions about the ease of use and the usefulness of the system. Hence the following hypotheses were developed:

Hypothesis 8: Organizational support will positively affect instructor's perceived usefulness of using e-Learning system.

Hypothesis 9: Organizational support will positively affect instructor's perceived ease of using e-Learning system.

3.5. Training

Training provides users with a hands-on mechanism to deployment of useful relevant information about the new system, and allowing them to explore the system from a technical standpoint and functional perspective [61]. Furthermore, training interventions can mitigate the invoke of passive reaction from users toward the new system [6].

According to the [6][60] studies, the trainees when obtain adequate training, it would qualify their familiarities with any technology. And thus, this will affect positively on their perceptions about the ease of use and the usefulness of the system. Hence the following hypotheses were developed:

Hypothesis 10: Training will positively affect instructor's perceived usefulness of using e-Learning system.

Hypothesis 11: Training will positively affect instructor's perceived ease of using e-Learning system.

4. METHODOLOGY

This study uses three approaches. First approach, reviewed previous studies to help in build an initial proposed model based on the main TAM factors integrated with interventional factors. Second approach, constructed a questionnaire to provide measures of the proposed model factors, these measures were developed by using confirmatory factors analysis (CFA). Finally, developed and estimated a structural model (figure 3) by using structural equation modeling (SEM) techniques.

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A quantitative structured survey method has been used to answer the research questions and to test hypotheses. Quantitative data were related to TAM and interventional factors that influence the adoption of e-Learning collected via a survey technique which was distributed to a random sample (n=352) of full-time lecturers at twelve universities distributed in West Bank and Gaza in Palestine. The researcher retrieved 305 responses with a response rate of 86.6%.

Research questionnaire was designed with closed questions which allowed respondents to make quick choices among a set of alternatives based on five-points Likert-scale that has helped in achieving the objectives of this research by providing a accurate data and results without ambiguous despite the large size of the research population. The questionnaire consisted of nine sections: Section One, represents personnel information which elicited such information as gender, age, faculty, teaching experience, and academic rank; Section Two, some questions were set to measure the computer and internet usage; Section Three, consists of twenty-four statements to examine the variables were determined in the previously proposed framework in this study. The third section statements which listed in Table 4, developed based on specific previous empirical studies as a main source, and on the viewpoint of universities' experts in e-Learning fields.

The survey content was validated by a group of experts and arbitrators who reviewed, and by a pilot test which conducted with a twenty participant who were not involved in the actual data collection process. Then the reliability of the survey was tested by using Cronbach's alpha method that ranged from 0.70 to 0.95, bigger than 0.70 for all factors in the model (Table 5). Thus, the research tool is considered reliable.

Table 5: Reliability Statics of Factors Influencing e-Learning.

Factor Influencing e-Learning Adoption	Cronbach's alpha
Usefulness	0.780
Ease to Use	0.740
Intention	0.864
Management Support	0.754
Design Characteristics	0.700
Organizational support	0.894
Training	0.954

The research questionnaire was collected, then its variables were coded and defined in to the (SPSS v23) program by which various statistical analysis tools were employed in order to investigate factors influencing e-Learning adoption.

5. RESULTS AND FINDINGS

The results of data analysis which were collected via survey indicate that all statements are significant and inter-item correlated (Table 6), and indicate that there are some statistical differences among participants according to their ages, colleges, universities, internet usage, and computer usage. Furthermore, the results indicated that the highest percentage of participants are males (83%), aged 40-49 years old (34.1%), from An-Najah National University (25.2%), lecturing in human faculties (50.8%), having teaching experiences 6-10 years (30.2%), ranked into assistant (43%), using internet from 1-3 hours per day (47.9%), using internet speed 2M (42.6%), and using computer at work every day from 1-3 hours (51.5%).

In addition, all hypotheses that derived from TAM and that related to intervention factors were supported and significant at 99% as shown in Table 7. And the coefficient of determination of intention to use e-Learning in the research framework is 50.3%, where perceived usefulness is the strongest intention determinant as the results shown.

Table 7: Results of Hypothesis Testing

Hypotheses	R^2	(ρ) Pearson Correlation	Type of Correlation	P-Value
Hypothesis 1	0.452	0.672	Positive	0.00
Hypothesis 2	0.320	0.565	Positive	0.00
Hypothesis 3	0.370	0.609	Positive	0.00
Hypothesis 4	0.090	0.300	Positive	0.00
Hypothesis 5	0.085	0.291	Positive	0.00
Hypothesis 6	0.094	0.306	Positive	0.00
Hypothesis 7	0.114	0.338	Positive	0.00
Hypothesis 8	0.067	0.258	Positive	0.00
Hypothesis 9	0.053	0.231	Positive	0.00
Hypothesis 10	0.066	0.256	Positive	0.00
Hypothesis 11	0.072	0.269	Positive	0.00

5.1. Behavioral Intention Results

The results of linear regression analysis of hypotheses shows that behavioral intention is jointly predicted by perceived usefulness (ρ=0.672, P<0.01), and perceived ease of use (ρ=0.565, P<0.01). The factors: usefulness explain 45.2%

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(R^2=0.452), and ease of use explain 32% (R^2=0.320) of the variance on intention to use e-Learning, where R^2 represents the coefficient of determination, their values shown in Table 6.

5.2. Perceived Usefulness Results

The results of linear regression analysis (Table 6) shows that perceived usefulness is jointly predicted by perceived ease of use (ρ=0.609, P<0.01), management support (ρ=0.300, P<0.01), design characteristics (ρ=0.306, P<0.01), organizational support (ρ=0.258, P<0.01), and training (ρ=0.256, P<0.01). These factors explain the factor usefulness of using e-Learning technology as following percentages: ease of use 37% (R^2=0.370), management support 9% (R^2=0.090), design characteristics 9.4% (R^2=0.094), organizational support 6.7% (R^2=0.067), and training 6.6% (R^2=0.066).

5.3. Perceived Ease of Use Results

The results of linear regression analysis shows that perceived ease of use is jointly predicted by management support (ρ=0.291, P<0.01), design characteristics (ρ=0.338, P<0.01), organizational support (ρ=0.231, P<0.01), and training (ρ=0.269, P<0.01). These factors explain the factor perception ease of use toward using e-Learning as following percentages: management support 8.5% (R^2=0.085), design characteristics 11.4% (R^2=0.114), organizational support 5.3% (R^2=0.053), and training 7.2% (R^2=0.072), (Table 7).

5.4. Correlations Among Groups Intervention Factors

There are significant correlations among Intervention factors. All these homogenous factors are connected with each other. The following Table 8 explores the positive correlations among these factors as empirical study shows:

Table 8: Correlations Among Intervention Factors

Intervention Factor		Management Support	Design Characteristics	Organizational Support	Training
Management Support	Pearson Correlation	1	.433**	.656**	.556**
	Sig. (2-tailed)		.000	.000	.000
Design Characteristics	Pearson Correlation		1	.383**	.401**
	Sig. (2-tailed)			.000	.000
Organizational Support	Pearson Correlation			1	.628**
	Sig. (2-tailed)				.000

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

5.5. A Framework Testing Results

Based on the results of hypotheses, the researcher determined the framework for e-Learning adoption (Figure 4).

5.6. The Structural Model Results

This study used the commonly measures of model fit which are summarized in Table 9, based on the analysis of the structural model by IPM SPSS AMOS v23.0 software.

According to Bollen's [62] criteria, the results indicated an acceptance fit to the data and the model was fully identified.

Table 9: SEM Statistics of Model Fit

Model goodness-fit indexes	Measure	Recommended Value	Result
Chi-square	CMIN		524.243
Degrees of freedom	DF		234
Chi-square/degree of freedom	CMIN/DF	≤ 3.0	2.315
Goodness-of-fit index	GFI	≥ 0.9	0.887
Adjusted goodness-of-fit index	AGFI	≥ 0.8	0.842
Normalized fit index	NFI	≥ 0.9	0.9
Comparative fit index	CFI	≥ 0.9	0.942
Tucker Lewis Coefficient	TLI	≥ 0.9	0.931
Root mean square error of approximation	RMSEA	≤ 0.08	0.064

Note: N = 305, *p<0.01

Table 10 summarizes the standardized causal effects of the observed variables on the latent variables.

Direct effects represents those where the change in one variable (e.g. x) results on a change in variable y (x → y). While indirect effects occur when a change in variable y contingent on a change in x operates through a mediator variable z (x → z → y).

Total effect represents the path strength whilst those greater than 0.8 considered to be large effects, those greater than 0.5 are medium, and those in the 0.2 to 0.5 are small [63].

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Table 10: Standardized Causal Effects

Factors	Determination	Direct Effect	Indirect Effect	Total Effect
Intention PI	DC	-	4.217	4.217
	T	-	-0.606	-0.606
	OS	-	7.454	7.454
	MS	-	-10.264	-10.264
	EoU	-1.447	1.938	0.491
	PU	2.288	-	2.288
Usefulness PU	DC	1.492	1.338	2.830
	T	-0.138	-0.502	-0.640
	OS	3.553	-1.164	2.389
	MS	-4.663	0.695	-3.968
	EoU	0.874	-	0.874
Ease of Use EoU	DC	1.638	-	1.638
	T	-0.592	-	-0.592
	OS	-1.374	-	-1.374
	MS	0.820	-	0.820

6. DISCUSSION

This section presents the dissection of the research results and findings of analysis for the data collected via survey.

6.1. Hypotheses Testing Discussion

All hypotheses are supported and significant at 99%. This indicates that all results are logical and can be adopted.

6.2. Personal Information and Technology Usage Discussion

The highest percentage of participants is males who form 83.0% of respondents. This corresponds to what is indicated by the statistics of the Ministry of Education and Higher Education in 2013, which showed that the ratio of males to females who were hired in the Palestinian universities as 84% to 16%.

Furthermore, the highest percentage of participants from An-Najah National University who form 25.2% of participants. This result is expected; because An-Najah University is the largest Palestinian universities in terms of the number of lecturers and students [64].

6.3. Discussion of Statistical Differences according to Lecturer College

These Results indicates that lecturers who specialist in Human Science, have better perception about the training they received for the use of e-Learning without any of invoke passive reaction. Therefore, they realized the extent of management's commitment to the implementation of all forms of learning that are supported by emerging technologies, and they hold the e-Learning functionality which they considered tangible and observable. So, they have a higher intention to use e-Learning.

As for the specialists in the natural sciences who are familiar with emerging technology, because of the need to use it, whether it was during the study or in the education process, they did not feel or catch the difference and did not touch the results of the use of e-Learning as the lecturers who specialize in Human Science. Perhaps their experience in employing and using of technology, made them able to identify the e-Learning quality based on the efficient of its functions, interactions, and contents.

6.4. Discussion of Statistical Differences according to Age

The results indicate that the participants aged in the forties who have dealt with various traditional systems of education and by virtue of their experience, they realized the usefulness and benefits of e-Learning and its impact on the progress of education process. This is contrary to the impression of elderly aged 50 and more who felt that e-Learning has become a burden. As it also contradicts the perception of participants aged in the twenties who are familiar with technology where they also aware of how optimal use of its application in their job, and in this area of technology there is a fact that is dealing with computer became a mandatory requirement in education, and essential to have someone the opportunity to employment, that's what made them do not feel the substantial difference toward the usefulness of e-Learning.

And, the results indicate that the participants who are in the thirties and forties have received professional developments and adequate training to handle the organizational and technical resources for use in e-Learning, more than participants who their ages crossed the fifties; that because who aged fifties and more are accustomed to the traditional education system, moreover they have awe toward culture change and technology use.

Furthermore, the results indicates that participants aged in thirties and forties have high belief that management has a direct or an indirect committed to the successful implementation of e-Learning system by customizing some IT features and applications, or providing resources, sponsoring, or directives which considered to be one of the most critical success factor for the complex systems implementation. So, the more experience in using technology, the belief of the

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importance management support in the implementation phase will be increased.

6.5. Discussion of Statistical Differences according to University

The results of statistical differences between universities superiority appear in perception in favor of Hebron, Islamic, Al-Quds Open University, and Bethlehem universities in most factors that affect e-Learning acceptance by lecturers, especially those related to interventional factors which considered to be more tangible from the viewpoint of lecturers in those universities when compared to the others.

The lecturers of those universities clearly had received a hands-on mechanism to employing the e-Learning in education process, and to explore the emerging technologies from a technical standpoint and functional perspective.

6.6. Discussion of Statistical Differences according to Internet Usage

These results indicates that participants who represents the least of internet usage per hours per day have lowest believe that management has committed to successful implementation and use of e-Learning system when compared to others who use internet more than 3 hours per day, and thus its impact on behavioral intention toward the actual use of e-Learning technology. So, the more hours of internet use leads to better results in the e-Learning adoption.

6.7. Discussion of Statistical Differences according to Computer Usage

These results indicates that participants who represents the least of computer usage per hours per day have lowest believe that university activates or functions assist and support users in the e-Learning system usage in various forms when compared to others who use computer more than 3 hours per day. So, the more hours of computer use leads to better results in the e-Learning adoption.

6.8. Discussion of Correlations Among Grouped Factors

All interventional factors in the research framework are connected with each other with a significant correlations. This indicates for instance, increased effort to train lecturers on the use of e-Learning system will raise the level of organizational support, and thus positively push up the lecturers perceived ease of use, and this is what will increase their Intention to adopt and use the system.

7. CONCLUSION

The discussion results in the previous section appear that the role of institutional interventions are very important in achieving high level of e-Learning adoption among faculty members. In addition, whenever the speed of Internet be higher, and the more hours using a computer and Internet by lecturers, it will enhance their e-Learning acceptance.

And, based on the research findings, Palestinian universities should work on their enhancing operational processes, developing e-Learning infrastructure, introducing services with high quality, overcoming lecturers anxiety from using a computer and enhancing their self-efficacy in dealing with new technology, and coordinating with other entities such as government, ICT companies, and offices transfer software programs; according to new strategies to be formed for these purposes.

In addition, with regard to research results present following conclusions:

- Universities should promote their role to achieve high level of e-Learning adoption through involving lecturers and students in the development process to decline the resistance to change when applying new technology, utilizing ease of use applications and tools, showing the usefulness of e-learning and its positive outcomes in a manner that stimulates the use after presenting its result demonstrability.
- IT centers in the universities should cooperate with internet companies in Palestine to provide lecturers with special offers in order to increase the use of internet. The study demonstrated that when the number of hours of internet usage by lecturers per day has increased, it will create a positive impression toward management support, and thus promote their intention to use e-Learning.
- Universities should train their lecturers to use the computer and its programs effectively in order to encourage them to use a computer more hours per day when performing specific tasks or jobs. This would enhance their believes that organizational and technical resources exist to support the use e-Learning system.
- Universities management should committed to a successful implementation and use of e-Learning in the universities which are

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considered to be the weakest in the field of management support.

- Universities should mitigate the invoke 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 which are considered to be the weakest in the field of organizational support and training.
- Universities should coordinate with experts in the field of e-Learning to make lecturers listen to success stories, especially the elderly lecturers. In this way, lecturers can be aware of the usefulness of e-Learning.

8. RESEARCH LIMITATIONS

This study limited its scope to examining the interventional factors influencing the e-Learning adoption based on TAM model. The study population was limited to the lecturers of all universities in Palestine.

9. FUTURE STUDIES

The following topics could be studied in the future, which may contribute on developing e-Learning and its usage: studying the factors that affecting e-Learning acceptance by students, and studying the possibility of delivering mobile learning materials or interactive content in universities.

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Table 4: Source of Questionnaire Statements.

Factors		Questionnaire Statements	Source of the Statements
Usefulness (PU)	*PU1*	*Using (the system's name) makes my lifestyle easier*	Liao et al. [65]; Davis [66]; Chen et al. [9]
	PU2	*Using (the system's name) improves my performance in my job*	Venkatesh [11]; Park [67]; Davis [5]; Mohamed and Abdul Karim [68]; Venkatesh and Bala [6]; Sun and Zhang [69].
	PU3	*I believe (the system's name) is a useful learning tool*	Liaw and Huang [70]; Liaw (2008)[71]; Sun and Zhang [69].
Ease to Use (EoU)	*EoU1*	*My interaction with (the system's name) is clear and understandable*	Davis [5]; Liao et al. [65];Igbaria et al. [72]; Venkatesh [11]; Mohamed and Abdul Karim [68]; Venkatesh and Bala [6].
	EoU2	*Interacting with (the system's name) does not require a lot of my mental effort*	Liao et al. [65]; Igbaria et al. [72]; Venkatesh [11]; Chismar and Wiley-Patton [73]; Venkatesh and Bala [6].
	EoU3	*I find (the system's name) easy to use*	Park [67]; Liao et al. [65]; Igbaria et al. [72]; Venkatesh [11]; Mohamed and Abdul Karim [68]; Venkatesh and Bala [6]; Sun and Zhang [69].
Intention (PI)	*PI1*	*Assuming I had access to (the system's name), I intend to use it.*	Venkatesh [11]; Venkatesh and Bala [6].
	PI2	*If significant barriers did not exist, I would use (the system's name)*	Chismar and Wiley-Patton [73];
	PI3	*I'm willing to go voluntarily to experience (the system's name)*	Experts in e-Learning sector
Management Support (MS)	*MS1*	*managerial support is more effective for (the system's name) implementation*	Developed by researcher; Experts in e-Learning sector
	MS2	*Direct management support are important in creating favorable perceptions toward (the system's name)*	Developed by researcher; Experts in e-Learning sector
	MS3	*The university established a senior position or positions specifically for (the system's name) management*	Developed by researcher; Experts in e-Learning sector
	MS4	*The university have appropriate policies outlining the intellectual property of course material*	Developed by researcher; Experts in e-Learning sector
	MS5	*Most of our (the system's name) technology services are supported through a centralized system*	Developed by researcher; Experts in e-Learning sector
Design Characteristics (DC)	*DC1*	*The design characteristics of (the system's name) remain stable throughout the implementations process*	Developed by researcher based on questions of: Venkatesh and Bala (2008)[6]; Aggorowati et al. (2012)[74]; Experts in e-Learning
	DC2	*(The system's name) applications and elaborations are not difficult to understand and use*	Developed by researcher based on questions of: Venkatesh and Bala [6]; Aggorowati et al. [74]; Experts in e-Learning sector

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Organizational support (OS)	*OS1*	*The University provides telecommunications equipment and computer resources to use (the system's name)*	Developed by researcher; Experts in e-Learning sector
	OS2	*The University support and encourage staff to use (the system's name)*	Developed by researcher; Experts in e-Learning sector
	OS3	*Help is available from the university when I have a problem in using (the system's name)*	Developed by researcher; Experts in e-Learning sector
	OS4	*the University provides educational seminars and interviews that help to using (the system's name)*	Developed by researcher; Experts in e-Learning sector
Training (T)	*T1*	*The kind of training in using of (the system's name) that provided to me was complete*	Amoako-Gyampah and Salam [61].
	T2	*My level of understanding (the system's name) was substantially improved after going through the training program*	Amoako-Gyampah and Salam [61].
	T3	*The training gave me confidence in (the system's name)*	Amoako-Gyampah and Salam [61].
	T4	*The trainers aided me in my understanding of (the system's name)*	Amoako-Gyampah and Salam [61].

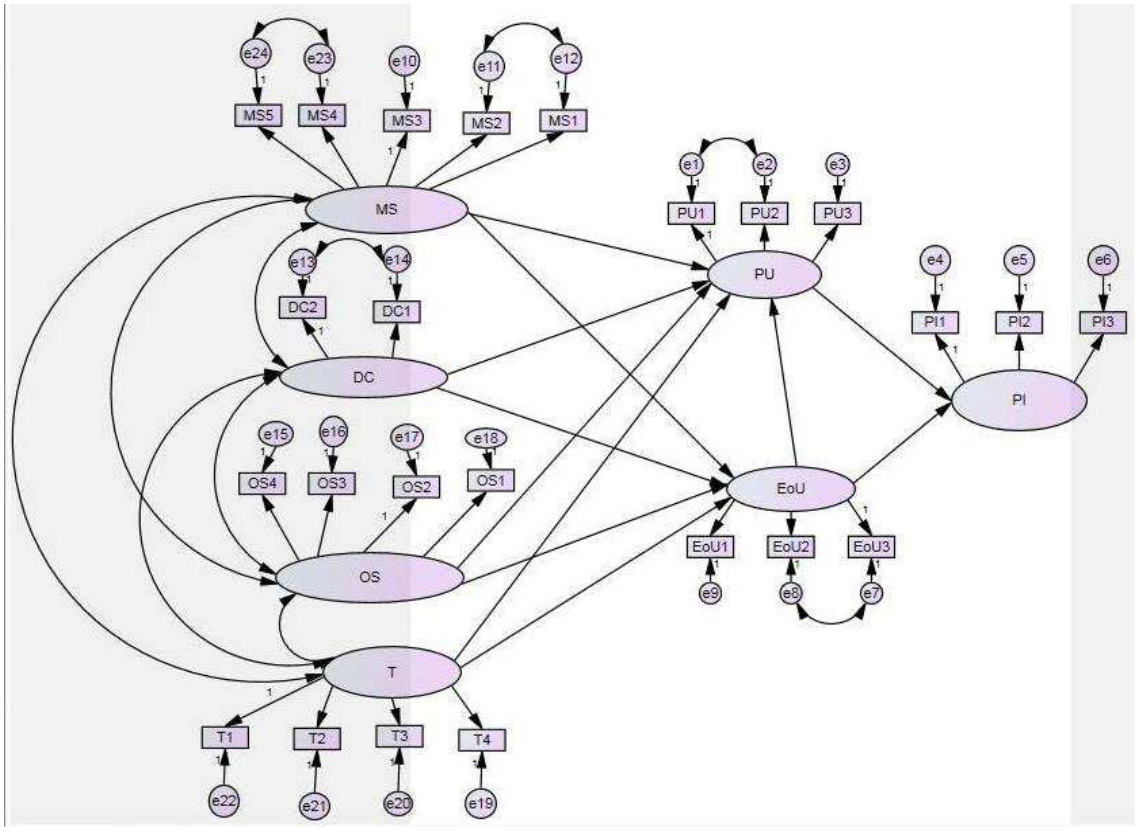

Fig. 3 : Structural Model

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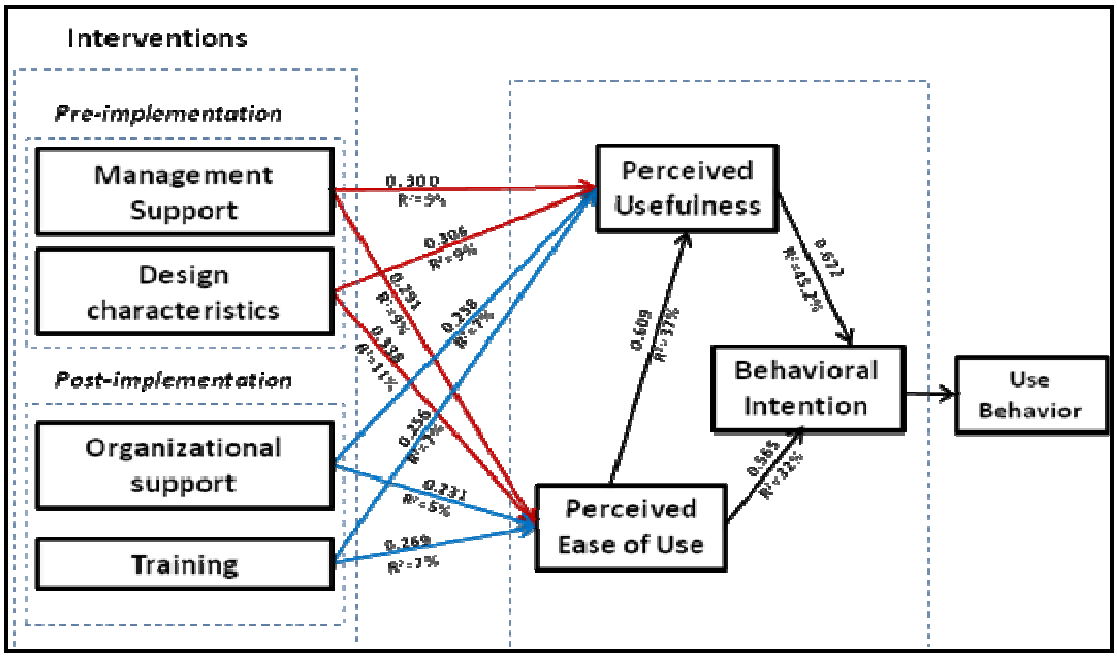

Fig. 4: Research Model

Table 6:Survey Items Cross-Correlations

	PU1	PU2	PU3	EoU1	EoU2	EoU3	PI1	PI2	PI3	MS1	MS2	MS3	MS4	MS5	DC1	DC2	OS1	OS2	OS3	OS4	T1	T2	T3
PU1	1																						
PU2	.623**	1																					
PU3	.498**	.505**	1																				
EoU1	.496**	.509**	.505**	1																			
EoU2	.441**	.266**	.213**	.380**	1																		
EoU3	.519**	.460**	.421**	.598**	.536**	1																	
PI1	.554**	.583**	.517**	.559**	.327**	.474**	1																
PI2	.452**	.515**	.438**	.466**	.358**	.413**	.738**	1															
PI3	.460**	.476**	.490**	.455**	.306**	.434**	.705**	.605**	1														
MS1	.221**	.254**	.312**	.207**	.155**	.213**	.309**	.278**	.272**	1													
MS2	.228**	.241**	.314**	.194**	.140*	.224**	.288**	.263**	.259**	.821**	1												
MS3	.158**	.147*	.261**	.290**	.189**	.325**	.206**	.176**	.233**	.274**	.305**	1											
MS4	.148**	0.062	.123*	.124*	0.033	.161**	.153**	.146*	.165**	.129*	.213**	.435**	1										
MS5	0.049	0.097	.256**	.213**	0.019	.216**	.178**	.196**	.285**	.216**	.257**	.638**	.572**	1									
DC1	.184**	.167**	.243**	.198**	.223**	.235**	.272**	.225**	.251**	.189**	.224**	.326**	.298**	.359**	1								
DC2	.219**	.222**	.315**	.298**	.171**	.341**	.242**	.194**	.277**	.215**	.209**	.292**	.206**	.340**	.527**	1							
OS1	.171**	.162**	.210**	.137*	.118*	.134*	.150**	.138*	.188**	.228**	.243**	.430**	.261**	.470**	.290**	.299**	1						
OS2	.158**	.214**	.295**	.259**	0.111	.241**	.203**	.227**	.252**	.280**	.255**	.633**	.364**	.566**	.285**	.275**	.624**	1					
OS3	.139*	.170**	.311**	.260**	0.082	.263**	.213**	.217**	.348**	.240**	.244**	.610**	.404**	.658**	.323**	.311**	.652**	.760**	1				
OS4	0.076	.129*	.278**	.216**	0.063	.196**	.188**	.162**	.317**	.280**	.248**	.595**	.321**	.604**	.287**	.260**	.536**	.733**	.785**	1			
T1	.168**	.205**	.235**	.346**	.126*	.287**	.219**	.269**	.296**	.222**	.251**	.502**	.384**	.456**	.350**	.330**	.368**	.548**	.536**	.539**	1		
T2	.127*	.155**	.252**	.318**	0.095	.264**	.229**	.212**	.283**	.186**	.240**	.488**	.400**	.500**	.344**	.306**	.411**	.537**	.588**	.553**	.835**	1	
T3	.175**	.262**	.262**	.335**	0.086	.253**	.280**	.291**	.308**	.212**	.275**	.482**	.416**	.468**	.385**	.312**	.392**	.502**	.550**	.528**	.829**	.893**	1
T4	.135*	.184**	.290**	.266**	0.049	.213**	.222**	.232**	.342**	.218**	.224**	.436**	.334**	.512**	.333**	.274**	.455**	.534**	.618**	.574**	.763**	.848**	.873**

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).