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Instructor attitudes towards e-learning agents using SEM analysis Statistical survey

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ABSTRACT

The purpose of this paper is to explore instructors attitudes towards e-learning (electronic learning) agents in Al Quds Open University (QOU), there will be a space to recognize the applicable styles of the open learning tools in QOU, and to measure the trends of the instructors towards them. statistical SEM model was built and tested through a sample of 200 instructors in QOU. The responses of their different 5-point Likert scale questionnaires are used to test the qualifying model. The statistical analysis of the SEM leads to significant results which demonstrate very positive trends towards the blending styles of teaching in QOU using SEM analysis. The paper identifying that there is a positive perceptions toward using e-learning and blended education styles for instructors depending on SEM investigations. Little prior articles have been done to measure the trend of attitudes for instructors and towards using e-learning styles in the education process. This paper proposes guidelines for developing e-learning environment tools in QOU through exploring the attitudes of instructors.

Key Words: E-learning, blending styles, attitudes, agents, SEM.

1. Introduction

Structural Equation Modeling (SEM) is near to the multivariate procedure that, allows examination of a set of relationships between one or more independent variables, and one or more dependent variables, either continuous or discrete. SEM deals with measured and latent variables by a combination of multiple regression and factor analysis.

SEM technique with Technology Acceptance Model (TAM) will be used in this article to identify and measure the instructor's attitudes towards e-learning in QOU. (Šumak, 2011) proposed TAM to explain the potential user's behavioral intentions when using a technological

innovation, because it explains the causal links between beliefs (the usefulness of a system and ease of use of a system) and users' attitudes, intentions, and the actual usage of the system.

E-learning (electronic learning) represents one of the most rapidly expanding in education. The use of internet and multimedia technologies as teaching and learning tools is now spreading and having enormous attention across experiments worldwide. The growth in e learning effects in recent years has been remarked in higher education institutes. This situation put both instructors and learners in new dynamic learning model through computer and word web wide (www), and surely affect on their attitudes towards e-learning as teaching and learning tools against traditional one.

Al Quds Open University (QOU) is one of the earliest higher institutions in Palestine that use open and blended types in teaching, learning and management courses , there are many applicable models of electronic and blended learning styles have been presented in QOU, such as virtual classes, moodle, OLAT, web-based, academic portal and video streaming. The main aims of QOU e-learning program is to improving access to education and training enhance the quality of learning and teaching and offer competitive advantage to the local society (Sabah, 2010).

This study aimed to investigate the instructor's attitudes towards e-learning agents in Al Quds Open University (QOU) and their perceived impact on the effectiveness of such educational style against traditional ones.

This paper is organized as follows: In the next, theoretical backgrounds and a summary of the literature review in the field of e-learning system are given, then the research model and the causal hypotheses are stated, the research methodology that guided this study is described included data analysis and results are given, the last section concludes the paper with the implications and recommendations of the study.

2. Literature review

The concept of e-learning widely use with rich tools as effectiveness teaching style in the higher education process, Beamish et al. (2002) defined e-learning as a wide set of application and processes allied to training and learning that include computer based learning, online learning, virtual classrooms and digital collaboration. Zapallska et al. (2006) recognize that individual learning styles must be taken into account in the instructional design template used in online education, use of e-learning had a positive impact on some aspects of learners' ability to

independently manage their own learning. (Becta, 2004) indicates that information communications technology ICT and e-learning are still largely peripheral to classroom teaching and are most widely used for additional support activities to extend independent learning. Several services provided by e-learning system in different types, Šumak et. al (2011) present some of such services as, course content management, synchronous and asynchronous communication, the uploading of content, the return of students' work, peer assessment, student administration, the collection and organization of students' grades, online questionnaires, online quizzes, tracking tools, etc .

The literature review covers researcher's efforts in augmenting the effectiveness of e-learning as a new teaching style and the attitudes towards this style, Alhabahba et. al (2012) investigate the positive trend for the Malaysian student attitudes towards e-learning system using factor analysis. (Newton 2003) provides effective teaching and learning depending on the technology based solution, (Park, 2009) Analyze the Technology Acceptance Model in investigating university students' behavioral attitudes to use e-learning Korean universities with SEM technique.

Globally, the internationalism of the education and the flexibility needs of students in the class have faced higher education institutions to strive towards open and e-learning in the education systems (Latchem 2004, PLS RAMBOLL Management 2005).

3. Objectives

This study aims at investigating instructor's motivation and attitudes towards e-learning in QOU, according to TAM structure the relationship of instructors intention to use e-learning as a teaching strategy with their attitude, perceived usefulness, ease of use, and self efficacy of e-learning will be treated and analyzed using SEM.

4. Hypothesis

In accordance with the previously stated objectives and consistent with related literature, this study tested the following hypotheses:

H1: ***University instructors' behavioral intention to use e-learning (BI) will have a positive effect on their Perceived system satisfaction (PSS) (H11), Attitude (Att) (H12), perceived ease of use (PU) (H13), e-learning self-efficacy (PS) (H14), Computer skills (CSK) (H15),e-learning experience(EXP) (H16), and Field of teaching(FTE) (H17).***

H2: ***University instructors' Perceived system satisfaction (PSS) will have a positive effect on their Attitude (Att) (H21), perceived ease of use (PU) (H22), e-learning self-efficacy (PS) (H23), Computer skills (CSK) (H24),e-learning experience(EXP) (H25), and Field of teaching(FTE) (H26).***

H3: ***University instructors' Attitude (Att) towards e-learning will have a positive effect on their perceived ease of use(PU) (H31), e-learning self-efficacy(PS) (H32), Computer skills(CSK) (H33),e-learning experience(EXP) (H34), and Field of teaching(FTE) (H35).***

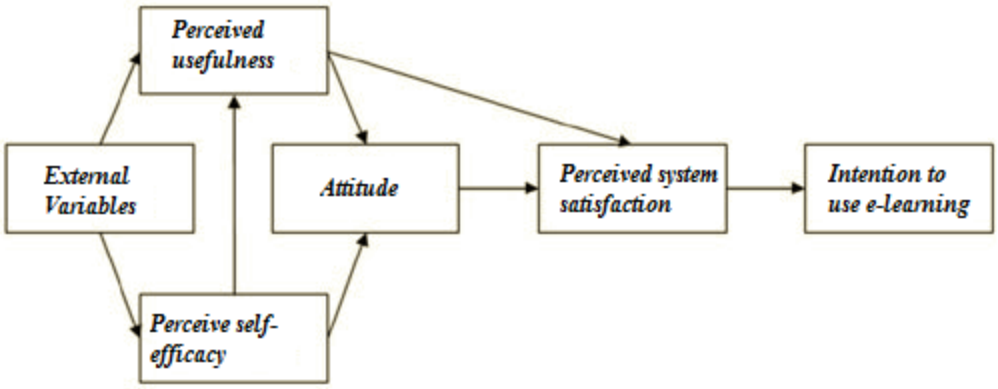
H4: ***University instructors' perceived ease of use(PU) e-learning will have a positive effect on their e-learning self-efficacy(PS) (H41), Computer skills(CSK) (H42),e-learning experience(EXP) (H43), and Field of teaching(FTE) (H44).***

H5: ***University instructors' e-learning self-efficacy (PS) e-learning will have a positive effect on their Computer skills (CSK) (H51),e-learning experience(EXP) (H52), and Field of teaching(FTE) (H53).***

5. Methodology

This study adopts a total view in the attitudes towards e- learning and technology tools used in the education system, taking into consideration the instructors in QOU. TAM will be used as a model for investigating the effect of some factors as, perceived usefulness, perceived ease of use, e-learning self-efficacy on instructor's attitudes and intention to use e-learning in QOU, the getting relations of the hypothesis will be tested through the SEM and the multiple regression models. Fig.(1) showed path diagram of the TAM model with relations (Šumak,2011).

***Fig.(1)*. Technology acceptance model (TAM)**



The data of this study was collected by means of a questionnaire that was focused on measuring attitudes towards e-learning technology for instructors in QOU. Besides the attitudes the questionnaires are tend to measure other topics closed to the main measured variable, such as, information technology usage, training needs, applicable e-learning tools etc. Such a total view is necessary because, in the modern constructive learning theory, education is considered a collaborative process, in which the roles of the student and the instructor are considered equally important to produce learning outcomes.

The questionnaire was developed and constructed after extensive review in the literature (Bernard et al. 2004; Newton, 2003; Liaw et al.,2007), and depending on Technology Acceptance Model (TAM) .

The instructor questionnaire includes three major components: demographic information, computer and internet skills, and attitudes towards e learning. *The demographic* part contains gender, teaching experience in open learning institutes, and the field of teaching.

The computer and internet skills contain operational system administration (e.g. Windows) text processing (e.g. MS Word), Spreadsheets (e.g. Excel, SPSS), slide editing (e.g. MS PowerPoint), web pages use, and e-mail to communicate students. In this part instructors were asked to indicate the experience of them in the previous skills, there responding alternative from 1 as no experience up to 5 as well experience. *Attitudes towards e-learning*, the attitudes for instructors will be indicated from 200 instructors working in QOU, through 18 items were all 5-point likert scales (from score 1 located a strongly disagree up to 5 which located strongly agree).

The questionnaire was reviewed by the authors for face validity and piloted on a sample of instructors in QOU and then revised accordingly. The sample consisted of 200 instructors; the populations of the sample are distributed over all QOU branches by the end of May 2012, the total number of instructors in the QOU was 1900 (www.qou.edu 2009). The questionnaire was sent electronically by the web page of the university containing a cover letter and guidelines for the sample's members.

6. Data analysis

The chosen sample for this study were 200 instructors worked in QOU during the academic year 2012/2013, the sample size is considered adequate for applying SEM for data analysis using LISER software.

The correlation matrix of the inserted variables is given in table 1

Table 1 : correlation matrix of discriminate validity of constructs

		PS	Attitude	PU	IU	PSS
Correlation	**PS**					
	Attitude	**.815****				
	PU	**.826****	**.772****			
	IU	**.514****	**.629****	**.721****		
	PSS	**.637****	**.808****	**.762****	**.744****	

**** sig. at 0.01**

Discriminanat validity was confirmed by calculating correlations among the constructs, the acceptance coefficient is considered to be around 0.80 correlation or large which indicates poor discriminanat construct validity in structural equation modeling (Park, 2009).

The total items reliability of the questionnaire had high values of Cronbach's alpha, around .8, and that's indicates a high quality level of the questionnaire.

The demographic distribution of the sample was calculated and briefed through table 2.

Table 2: demographic description of the sample (n=200)

	Variable	Number(N)	Percent (%)
Gender	**Male**	122	61.0
	Female	78	39.0
Job	**Fulltime**	81	40.5
	Par t time	119	59.5
E-learning experience	**never**	6	3
	1-2	31	15.5
	More than 2 years	163	81.5
Field	**Practical**	77	38.5
	Theoretical sciences	45	22.5
	Humanities	78	39

The multiple regression model between Intention to use e-learning (IU) as a dependent variable and the independent variables: Perceive self-efficacy (PS), Attitude (A), Perceived usefulness (PU) and Perceived system satisfaction (PSS).

The computer skills of the instructors in QOU is presented through table 3

Table 3: statistical measures of the computer skill variable of the instructors

Variable	Mean	S.Deviation	C.V
I am confident operating system	**4.31**	**1.01**	**0.23**
I am confident using MS Word	**4.58**	**0.85**	**0.19**
I am confident using Power Point	**4.47**	**0.86**	**0.19**

I am confident using e-mail	**4.51**	**0.86**	**0.19**
I am confident using internet pages	**4.48**	**0.86**	**0.19**

Table 4 showed the significant variable of the regression model.

Table 4: Linear multiple regression model of the variables

Variables	β	Beta	T	Sig.
Constant	**0.683**		**2.387**	**0.018**
PS	**0.430**	**0.315**	**3.369**	**0.001**
Attitude	**0.679**	**0.486**	**2.396**	**0.014**
PU	**0.821**	**0.592**	**6.462**	**0.000**
PSS	**0.589**	**0.425**	**5.088**	**0.000**
F = 157.441				**F Sig. 0.00**
R = 0.874				**R2 = 0.764**

Linear regression was used for prediction of changes in perception of virtual students regarding e-learning. The linear regression analysis indicated that 76.4% of variation in instructors perceived system satisfaction of e-learning with the independent variables, and can be formulated as,

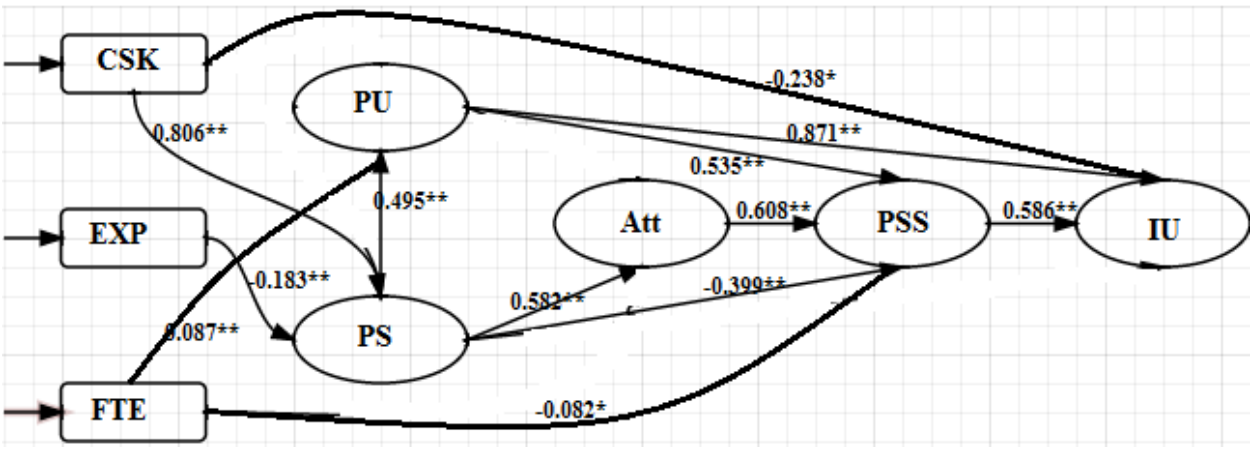
IU = 0.315 PS + 0.679 Attitude + 0.592 PU + 0.425 PSS

The regression equation indicates that instructors' institution to use e-learning is strongly affected by the independent variables of the study.

To generalize the regression model in order to test the relationships presented by the hypothesis, SEM will used. The size of the sample is adequate to analyze with SEM technique (Sridharan, 2010). To test the normality assumption Kolmogorov Smirnov test was used, with Z value 3.854 and sig. 0.000, and that's indicates a non- normal distribution of the data, therefore, the maximum likelihood method of estimation was chosen for conducting SEM analysis. A path diagram in SEM structure can be used to display graphically the hypothesized patterns of causal relations among a set of variables. Observed variables are enclosed in rectangles; unobserved or latent variables, in circles. Single-headed arrows represent the direct causal effect of one variable on another. Curved double-headed arrows indicate that two variables are correlated.

The structural equation model specifies the hypothesized causal relationships among the latent variables. Figure 2 showed the bath diagram of the SEM structure as a presentation of the study hypothesis.

***Fig.(2)*. The significant relations between the variables of the study**



R^2 = 97.2% , χ^2 = 205.79**, RMSEA = 0.495

The previous coefficients indicate a good fitness of the SEM model, and also the internal correlation coefficients between variables give a significant trend of the qualification of the desired model. The SEM indicated that 97.2% of variation in variables of the study, the significant value of the χ^2 give a good sense towards the desired SEM model, and the RMSEA = 0.495 was less than 0.8 and that's prove the goodness fit of the model (Šumak,2011).

According to the path diagram of SEM of the hypothesis we can get the following decisions arranged in the following table.

Table 5 : results of the hypothesis

Hypothesized path	Direct effect	T- value	Result of hypotheses
PSS → IU (H11)	**0.586**	**5.02****	Supported
Att → IU (H12)	**0.102**	**0.832**	Not supported
PU→ IU (H13)	**0.871**	**6.774****	Supported
PS→ IU (H14)	**-0.258**	**-1.760**	Not supported
CSK→ IU (H15)	**-0.238**	**-2.172***	Supported
EXP→ IU (H16)	**-0.097**	**-0.984**	Not supported
FTE→ BI (H17)	**-0.063**	**-1.16**	Not supported
Att → PSS (H21)	**0.608**	**9.873****	Supported
PU → PSS (H22)	**0.535**	**7.71****	Supported
PS → PSS (H23)	**-0.399**	**-4.459****	Supported
CSK → PSS (H24)	**0.065**	**0.967**	Not supported
EXP → PSS (H25)	**0.014**	**0.231**	Not supported
FTE → PSS (H26)	**-0.082**	**-2.514***	Supported
PU → Att (H31)	**-0.063**	**-0.829**	Not supported
PS → Att (H32)	**0.582**	**7.35****	Supported
CSK → Att (H33)	**0.003**	**0.049**	Not supported
EXP → Att (H34)	**0.005**	**0.092**	Not supported
FTE → Att (H35)	**-0.023**	**-0.74**	Not supported
PS → PU (H41)	**0.495**	**7.446****	Supported
CSK → PU (H42)	**0.068**	**1.111**	Not supported
EXP → PU (H43)	**-0.014**	**-0.259**	Not supported
FTE → PU (H44)	**0.087**	**2.969****	Supported
CSK → PS (H51)	**0.806**	**22.586****	Supported
EXP → PS (H52)	**-0.183**	**-3.023****	Supported
FTE → PS (H53)	**0.024**	**0.742**	Not supported

***sig. at 0.05**
**** sig. at 0.01**

7. Results and discussion

The purpose of this study was to test the instructor's attitudes towards e-learning in QOU, The study also examined the effect of some factors and its relation in the attitudes of the instructors and their skills in e-learning processes.

The results of the multiple regression analysis showed that there is a significant effect of the indicators perceived usefulness, perceived ease of use, e-learning self-efficacy on instructor's attitudes and intention to use e-learning.

The results of the model indicate a strong support for H11, H13, H15, H21 ,H22, H23, H26, H32, H41, H44, H51 and H52.

In this study, SEM was used to test the hypothesized model in evaluating the instructors' preferences for and perceptions of the critical factors influencing the e-learning effectiveness. The hypothesized model proposed various positive relationships between the exogenous and endogenous variables.

8. Recommendations

In the future, the term e-Learning may be obsolete because technology will appear invisible to both the learner and instructor because the technology-rich environment will fill the gap of the necessity of real class-room environment. Hence research on manifold issues is needed. One of the scopes could be that e-Learning technologies will allow for a humanized learning environment (Virginio, et al, 2004) and so this paper tends to characterize such humanized agent.

QOU have to support the positive trends of the instructors toward e-learning by training courses and more workshop and academic days to discuss and develop the skills of instructor's in computer and e-learning requirements.

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