

Technology Acceptance Model for the Use of Learning Through Websites Among Students in Oman

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Abstract: *The purpose of this paper is to identify the main factors that influence the student's learning through websites. In this study, the survey questionnaires were administered to a sample of 100 students at Sultan Qaboos University, Oman. The basic framework of this study uses Technology Acceptance Model (TAM) which is duly modified by incorporating some factors which is suitable for the goal of the research work. The factors analysis and Regression analysis are used to identify and rank factors significantly influencing the student's behavioral intention towards website learning which in turn influence its acceptance among students. A significant finding that resulted from the systematic study was that students attitude and behavioral intention to use learning through websites influenced by critical factors such as perceived usefulness, perceived ease of use, perceived website quality, and computer self-efficacy which are critical factors for students' attitude and behavioral intention to use the learning through websites. The empirical findings of this study are useful for universities, Internet operators, policy makers and students. This study offers an insight into learning through websites in Oman. Few studies are done on this topic so its contribution will be significant to the literature of e-learning. A part of this research has been accepted in a conference at Ibra college of technology, Oman on 04 march 2012.*

Keywords: TAM, e-Learning, Regression, Factor analysis, Oman.

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1. Introduction

Technology has remained an important driver of change for centuries. Last two decades have witnessed numerous significant innovations and developments in the area of information and communication technology (ICT). These developments in the area of information and communication technology have triggered a lot of changes in the education sector as well. Electronic learning has evolved as an important facilitator in teaching-learning process. Electronic learning (e-learning) refers to the learning process facilitated and supported through information and communication technologies (ICTs) [12]. Information and communication technology assists learning through telephone lines, wireless signals, computer hardware, softwares and networks. A large number of educational institutions have incorporated e-learning tools to support their distance, online and regular full time on campus programmes. There is a substantial growth in the use of e-learning platforms in higher education from universities around the world [14]. E-learning primarily focuses on web based learning, computer based learning and virtual learning. There has been tremendous increase in the use of e-learning and demand among university students [18]. There is an important need to investigate the factors influencing

the use and acceptance of e-learning to make it an effective tool in education.

Adoption and diffusion of information and communications technology could be studied at two levels viz. organization and individual. The focus of this study is at an individual level therefore emphasis is on the acceptance of technology [6]. Technology acceptance model (TAM) addresses the issues of users' attitude towards use of technology and its actual usage [7, 8]. Technology acceptance model (TAM) is a users' intention based model. It has been developed to explain and/or to predict the users' acceptance of computer technology [11]. In a number of studies, Technology acceptance model (TAM) has been used to explain a theoretical base for many empirical studies on users acceptance of computer technology in past [1, 7, 8]. This study considers technology acceptance model (TAM) as base and few more factors have been added to investigate attitude of students towards e-learning through websites and their behavioral intentions. The main focus of this paper is to answer the following research questions: (1) what are the main constructs that are affecting student's intention to use websites for learning?, (2) what is degree of strength of the relationship among these constructs?, and (3) what is the order of importance of these constructs?

2. Literature Review

Technology acceptance topic has been widely described through many theories/models. Some of the important technology acceptance theories/models are:

- Theory of Reasoned Action (TRA).
- Social Cognitive Theory.
- Technology Acceptance Model (TAM).
- The Motivation Model.
- Innovation Diffusion Theory (IDT).
- Theory of Planned Behavior (TPB).
- Decomposed Theory of Planned Behavior (DTPB).
- Combined TAM and TPB(C-TAM-TPB).
- Technology Acceptance Model 2 (TAM2).
- The Unified Theory of Acceptance and Use of Technology (UTAUT).

Each technology acceptance theory/model has different premises and benefits. The Theory of Reasoned Action (TRA) [2] postulates that beliefs influence attitude and social norms, which in turn shape the behavioral intention guiding or even dictating an individual's behavior. This theory is based on the assumption that individuals are rational decision makers and constantly evaluate their behavioral beliefs during the process of attitude formation towards their behavior. Social Cognitive Theory (SCT) suggests that human functioning should be viewed as the product of dynamic interplay of personal, behavior, and environmental influences [5]. The Technology Acceptance Model (TAM) was developed from Theory of Reasoned Action by [7]. TAM was developed to find out the factors which lead people to accept or reject information technology. TAM used TRA as the theoretical base for specifying the causal linkages between two key beliefs: perceived usefulness and perceived ease of use and users' attitudes, intentions and actual computer usage behavior. TAM replaced the determinants of attitude of TRA by perceived ease of use and perceived usefulness. [7, 8] found that perceived usefulness is the strongest predictor of individual's intention to use information technology. Adoption and use of information technology was studied by applying motivation theory by [9]. This model is known as Motivation Model and suggests that individual behavior is influenced by their intrinsic and extrinsic motivations. Extrinsic motivations could be perceived ease of use, perceived usefulness and subjective norms. While intrinsic motivations could be like enjoyment, playfulness and satisfaction. Innovations Diffusion Theory (IDT) describes the innovation-decision process. There were five identified attributes of innovation which influence adoption and acceptance of technology. These attributes are: compatibility, relative advantage, trial ability, complexity and observability.

The theory of planned behavior (TPB) evolved from the Theory of Reasoned Action, with an additional

construct perceived behavioral control (PCB). This theory extends TRA by including mandatory situation while TRA only focuses on voluntary situations. [16] defined perceived behavioral control as "perceptions of internal and external constraints on behavior". The PCB theory also assumes individuals as rational decision makers along the lines of TRA. Decomposed theory of Planned Behavior (DTPB) explores the dimensions of attitude belief, subjective norm (i.e., social influence) and perceived behavioral control by decomposing them into specific belief dimensions [16]. Augmented TAM or Combined TAM and TPB (C-TAM-TPB) was developed as a hybrid model [16] by combining the predictors of the theory of planned behavior (TBP) with the constructs of ease of use and perceived usefulness from TAM. Technology Acceptance Model 2 (TAM2) was developed by [17] by extending TAM to include perceived usefulness and usage intentions. TAM2 was developed by broadly adding social influences and cognitive instrumental process for the prediction of acceptance of information technology. Social influences mainly focused on subjective norm, image and voluntariness while cognitive instrumental processes included perceived ease of use, output quality, result demonstrability and job relevance. [17] introduced the Unified Theory of Acceptance and Use of Technology (UTAUT) with three main constructs which determine the intention to use an information technology. These constructs are performance expectancy, effort expectancy and social influence. Based on the literature review, the following research model and hypotheses are proposed for investigation.

3. Research Model and Hypotheses

3.1. Perceived Usefulness (PU)

One of the important components of Technology Acceptance Model (TAM), is perceived usefulness which has been used by many information system researchers. Perceived usefulness can be defined as the degree to which a person believes that using a particular system would enhance his or her job performance [7, 8]. In other word, the E-learning has a positive effect on the performance of the students, therefore they are more effective while using computer. The performance of students can be improved by e-learning. Hence, e-learning has a positive impact in the behavior of the student *Hypothesis 1: there is a positive relationship between perceived usefulness and behavioral intention.*

3.2. Perceived Ease of Use (PEOU)

PEOU is defined as the degree to which a person believes that using a particular system would be free of effort [7, 8]. In other words, the student who gets the education online, it is expected that they are

comfortable with the use of computer. In these days, students are quite friendly with computer because they often use it. It reflects the intention of students towards the usage of computer. *Hypothesis 2 : there is a positive relationship between perceived ease of the use and behavioral intention.*

3.3. Perceived Website Quality

Website quality is concerned with the personalization of the web pages. Its appearance plays a big role in the popularity of website in addition to the contents of its pages. The consistency of the user interface, ease of use, response rates, quality documentation, and sometimes, quality and maintainability of the program code is important for users [15]. Therefore, website quality is an important issue in its acceptance among students for learning. *Hypothesis 3: there is positive relationship between perceived website quality and behavioral intention.*

3.4. Computer Self-Efficacy

It is defined as an individual’s self- confidence in his or her ability to perform tasks across multiple computer application domains [13]. In other words, it shows our efficiency to use website and it comes directly from our regular use of various websites. *Hypothesis 4: there is positive relationship between computer self-efficacy and behavioral intention.*

3.5. Attitude Towards e-Learning

The factors, PU and PEOU predict attitudes of users toward the system. Further, Attitude and PU influence user’s BI to use the system. The use of system can be predicted by BI Attitude towards e-learning can be defined as your reaction and communication toward the e-learning websites. It shows your interest towards e learning websites and also your exposure of using websites. *Hypothesis 5: there is positive relationship between Attitude towards e-learning and behavioral intention.*

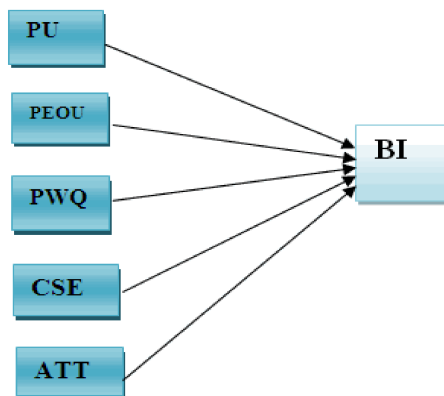


Figure 1. The proposed model.

4. Research Methodology

4.1. Survey Administration

The proposed hypotheses were tested by collecting data using survey method. Questionnaire were distributed randomly among students of Sultan Qaboos University (SQU) which is the only public university in the Sultanate of Oman. Students were selected randomly from different colleges to constitute a sample size of 100. All students were comfortable with the use of computer as well as Internet. Since the purpose of this study is find out the factors affecting students intention towards learning through websites so the demographic items were included in the questionnaire. Table 1 summarizes the demographic characteristics of students.

Table1. Sample demographics.

Variables	Characteristics	%
Gender	Male	30%
	Female	70%
Age	20 or less	31%
	21-25	68%
	above26	1%
College of Respondents	Art	21%
	Commerce	37%
	Education	13%
	Engineering	16%
	Science	13%
College year	First year	4%
	Second year	52%
	Third year	27%
	Fourth year	3%
	Fifth Year	14%
Experience of Internet use	less than 2years	4%
	2years to 5years	38%
	more than 5 years	58%

The percentage of gender participated in the survey was male (30%) and female (70%). Approximately 68% of the respondents aged 21-25 while 31% were aged 20 and less. The maximum number of respondents are from college of commerce by 37% while the lowest respondents were from college of education and science. The fifty two percent of respondents were in a second year and 27% were in third year. Moreover, 3% and 14% of respondent were in a first and fourth year respectively. Collectively, 58% of the students have more than 5 years' experience of using the internet and 38% have 2-5 years while 4% have less than 2 years.

4.2. Measurement Development

Measurement items taken in this study were developed based on the literature review and in consultation with the Information Systems experts keeping reliability and validity in view. We used five point likert scale from (1) 'strongly disagree' to (5) 'strongly agree' to assess responses from the respondents. A pilot test was performed on measurement items for a random sample of 25 respondents and questionnaire was modified based on the results.

5. Data Analysis

A parametric statistical techniques were used to test the proposed research hypotheses. Factor analysis is used to identify the underlying predictors of student's behavioral intention (BI) towards learning through websites. Correlation technique was used to show the strength of relationship among various constructs. The Pearson correlation coefficient is used when two variables are correlated linearly and this has been tested using scatter diagram. The regression is used to see the statistical significance of proposed model and then to rank the importance of the various parameters involved in the model.

5.1. Measurement Scale Validation

The data analysis is used in two steps as proposed by [4]. The first step involves the measurement analysis whereas second step involves the correlation and regression analysis. In measurement model, the internal consistency is being tested to show the strength of the model. The reliability measures were above the minimum recommended level of 0.70 to ensure the sufficient internal consistency of the measurement model [10]. The results of factor analysis and reliabilities for various constructs are given in table 2. Factor analysis yielded six factors based on the minimum Eigen value one. The sum of squared loadings based on extracted six factors including "perceived usefulness (PU)", "perceived ease of use (PEOU)", "perceived website quality (PWQ)", "computer self-efficacy (CSE)", "behavioral intention (BI)", and "Attitude(ATT)" produced a cumulative value of 77% in explaining the total variance of data. The appropriates of the factor analysis was tested by two important factors i.e. Kaiser- Meyer-Olkin (KMO) and Bartlett's test of sphericity. The KMO overall measure of sampling adequacy was 0.774, which is within the recommended level and statistically significant at $p < 0.05$. The Bartlett's test of sphericity was 880.49 (degree of freedom 153) and statistically significant at $p < 0.05$ which is the indication of good correlation among questions in the questionnaire.

Table 2. Factor analysis and statistical indicators.

Constructs	items	Factor loadings	Cronbach's alpha	% variance explained	Eigen value
Perceived Usefulness	PU1	.805	0.856	31.266	5.628
	PU2	.874			
	PU3	.854			
Perceived ease of use	PEOU1	.871	0.782	5.655	1.018
	PEOU2	.751			
	PEOU3	.821			
Perceived website quality	PWQ1	.876	0.822	9.772	1.759
	PWQ2	.766			
	PWQ3	.843			
Computer self-efficacy	CSE1	.790	0.834	11.662	2.099
	CSE2	.824			
	CSE3	.860			
Behavioral Intention	BI1	.809	0.806	8.211	1.478
	BI2	.737			
	BI3	.763			
Attitude	ATT1	.836	0.828	10.257	1.846
	ATT2	.767			
	ATT3	.892			

5.2. Examination of the Proposed Hypotheses

The table 3 shows Pearson correlation coefficients among dependent and independent variables. The correlation coefficient between PU and BI is ($r = .434, p < .05$) supports hypothesis 1. The hypothesis 2 is supported by correlation coefficient between PEOU and BI ($r = .387, p < 0.05$). The correlation coefficient between PWQ and BI is ($r = .356, p <$

$.05$) supports hypothesis 3. The hypothesis 4 is supported by correlation coefficient between CSE and BI ($r = .422, p < 0.05$). The correlation coefficient between ATT and BI is ($r = .399, p < .05$) supports hypothesis 5.

Table 3. Correlation coefficients.

		PU	PEOU	PWQ	CSE	ATT
BI	R	.434**	.387**	.356**	.422**	.399**
	Sig. (2-tailed)	.000	.000	.000	.000	.000

The model summary is given in Table 4. The coefficient of determination is 42% which shows that the variation explained in dependent variable due to independent variables.

Table 4. Model summary.

R	R Square	Adjusted R Square	Std. Error of the Estimate
.64	.420	.389	.53998

The table 5 reports ANOVA where a significant F statistic justifies the appropriateness of the proposed model.

- Predictors: (Constant), PE, Comp, CSE, PSQ, PEOU, ATT, PU
- Dependent Variable: BI

Table 5. ANOVA for regression.

Model	Sum of Squares	DF	Mean Square	F	Sig.
Regression	19.857	5	3.971	13.62	.00
Residual	27.408	94	.292		
Total	47.266	99			

Table 6. Results of multiple regression.

Model	Unstandardized Coefficients		Standardized Coefficients	T	Sig.
	B	Std. Error	Beta		
(Constant)	.302	.422		.716	.476
PU	.191	.076	.219	2.516	.014
PEOU	.214	.072	.242	2.950	.004
PWQ	.158	.074	.179	2.143	.035
CSE	.186	.085	.192	2.189	.031
ATT	.174	.067	.219	2.595	.011

The relative order of preference of the predictive factors of students intention towards learning through websites based on the beta values (given in table 6) can be summarized as follows: Perceived ease of use (B=0.242), Perceived usefulness (B= 0.219), Attitude towards learning through websites (B = 0.219), Computer self-efficacy (B = .192), and Perceived website quality (B = .179). These factors are statistically significant at 5% level of significance as the p value corresponding to all these factors are less than 0.05. Hence, H1, H2, H3, H4, and H5 are accepted.

6. Discussion of Findings

Substantial growth of internet is affecting our daily life in various dimensions. People are shifting their learning methods from traditional ones to technology based learning. In other words, we can say that e-learning is replacing traditional learning at a moderate pace. In this study, we found that perceived usefulness and perceived ease of use have a positive effect on the behavioral intention of students to use websites for learning. It can be interpreted that there is a perception among students using websites for learning that higher perceived usefulness results in more behavioral intention to use websites. Similarly, higher perceived ease of use also results in the higher behavioral intention to use websites for learning. In this research, it has been shown that perceived website quality has a positive relationship with behavioral intention of students. There is a positive relationship of attitude

A regression analysis was also conducted to test the proposed hypotheses and to identify how different factors affect the a behavioral intention(BI) of students to accept learning through websites as dependent variable. The value of standard error in our proposed model is 0.539 which is substantially less than the standard deviation (i.e.0 .69) of the dependent variable. Which further justifies that the use of proposed model is appropriate.

with behavioral intention towards learning through websites. Finally this research shows that computer self-efficacy also has a positive relationship with the behavioral intention of students. The onus of the information dissemination about e-learning is more on academic institutions. Therefore, it has become essential for academic institutions to identify the factors affecting students intention towards the adoption of learning through websites.

The current study identifies various statistical significant factors affecting students adoption of learning through websites in the Sultanate of Oman. E-learning plays a statistically significant role among students in SQU. Further, there exists a positive relation among behavioral intention and perceived usefulness, perceived ease of use, perceived website quality, computer self-efficacy, and attitude of students towards learning through websites.

7. Conclusion

This study investigated the factors those affects the acceptance of learning among students through websites in Oman. Additionally, this study has evaluated the effect of website quality of the intention of student's satisfaction. The contribution of this study is for validating the previous TAM results studied in various contexts and its usefulness by modified TAM in predicting the factors affecting students intention towards learning through websites. This is consistent with [3] stating that TAM is a powerful, highly reliable, valid and robust predictive model that may be

used in a various contexts. This study can be used by academic managers and academicians for better decision making. This study was done in the public university (SQU) of the Sultanate of Oman where the quality of students is considered to be the best in the country therefore the results obtained cannot be generalized. This shortcoming paves the way for further research. This study can be extended by taking a larger sample size for generalization of results. Furthermore, further studies can extend the TAM model by including factors such as culture, perceived risk of unreliable study material etc.

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