

Intention to Use University E-mail System based on Modified UTAUT Model: Perspectives of University of Benin Postgraduate Students

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ABSTRACT

Students' acceptance is one of the key fundamentals for development and success of University E-mail system. This research explores the level of acceptance and factors influencing the acceptance of the email system at University of Benin, Nigeria. This research modified and used the Unified Theory of Acceptance and Use of Technology (UTAUT₂), as a theoretical basis to conduct empirical research to test the factors that influence postgraduate students' intention to use the e-mail system introduced in their academic environment. To empirically test the model, a survey was administered three hundred and eight respondents consisting of postgraduate students from various faculties of the University. The research found out that the level of acceptance of the University E-mail system amongst the postgraduate students was moderate. However, the independent variables were found to have strong support for Performance Expectancy, Social Influence, Attitude and Facilitating Condition to predict the Behavioral Intention to use the University e-mail system. Based on the findings, Approaches on how to improve the level of acceptance and intention to use where recommended.

Keywords — Unified theory of acceptance and use of technology (UTAUT), UTAUT₂, technology awareness, attitude, e-mail system, technology acceptance

I. INTRODUCTION

Technological advancement have an important role in transforming and facilitating people's lives in various areas including communication, education, health, and economy. The role of technology in teaching and learning is rapidly becoming the most widely discussed issues in contemporary education policy [1, 2]. Experts in the educational field are of the opinion that information and communication technology (ICT) hold great promise to enhance teaching and learning in addition to shaping workforce opportunities if properly used. In this ever changing and technological world, many improved strategies are now being used for imparting knowledge and skills to students of all ages and educational levels. These Strategies are evolving with serious and vital implications on both the teachers and students. More dynamic and purposeful models of impacting knowledge are replacing the teacher-directed instruction and one of such strategy is the introduction of University e-mail system.

Popular e-mail systems used in Nigeria educational institutions include Round cube, Zimbra, SquirrelMail, and IceWarp. Problems such as limited inbox capacity, huge cost of acquiring and maintaining these systems [3] have necessitated the search for better options. To overcome these drawbacks, University of Benin in May 2011, migrated from its old SquirrelMail system to "Google Apps Education Edition" – a free suite of beneficial devices for Classroom collaboration hosted and powered by Google for University staff and students. This e-mail system gives users access to more feature-rich set of tools for communication and collaboration. Following the rollout of the e-mail system in May 2011, research has not been conducted to see how well the system has been adopted by students.

Despite the fact that university e-mail system brings numerous advantages, success from technical point of view alone does not determine the adoption of any developed the system. The level of acceptance of a technology by users is a determinant factor of its successful implementation [4]. Hence this study is important to investigate the affecting factors for intention to use University E-mail system.

2. RELATED WORKS

Users' acceptance is one of the key fundamentals for development and success of University E-mail system. Researchers have studied various theories that could be used to explain the acceptance or adoption of information technology innovations. Prominent theories include the Technology Acceptance Model (TAM) developed by Davis et. al. [5]; the Theory of Reasoned Action (TRA) developed by Fishbein and Ajzen [6]; the Theory of Planned Behavior (TPB) developed by Ajzen [7]. Among these models, the Technology Acceptance Model (TAM) is considered to be the most robust, parsimonious, and influential model in explaining acceptance of information technology by its users [5, 8, 9]. However, Mathieson et. al. [10] criticized the TAM stating that it was limited to the fact that the model assumes usage is volitional, that is, there are no barriers that would prevent an individual from using an information system if he or she chose to do so. Nevertheless, there might be situations where users are confronted with lack of time, money, etc which may prevent them from using the system [11].

To address the shortcomings of TAM, several researchers have attempted to improve the TAM model [12, 10, 13, 14, 15]. These studies modified the original TAM with resulted in more fragmentation of the TAM. Furthermore, researchers adopting any of these models had to make a choice from a large number of models and found that they must “pick and choose” constructs across the modified models, or choose a “favored model” and largely ignore the contributions from alternative models [11]. To address this issue [4] proposed a new model called the Unified Theory of Acceptance and Use of Technology (UTAUT) that overcomes the above mentioned limitations. The UTAUT model proposed by Venkatesh et al. [4] integrates the fragmented technology acceptance models and aims to explain user intentions to use an information system and subsequent usage behavior. According to the UTAUT₂ model, seven constructs are deemed to be direct determinants of user acceptance and usage behavior, these are: Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Hedonic Motivation, Price, and Habit, as shown in figure 1.

Perceived usefulness and ease of use which was originally used in the TAM study were incorporated as Performance Expectancy and Effort Expectancy in the UTAUT model. According to the UATUT model, Effort Expectancy is more salient in the early stages of using a new technology. In

contrast to previous technology acceptance models which were able to predict user acceptance of an innovation with about 40 percent accuracy [5], UTAUT was found 70 percent accurate in predicting user acceptance of information technology innovations [4].

UTAUT Model has been widely used by many researchers in different settings to explain the adoption of technologies. Marchewka et al. [16] in a study on student perceptions (in terms of applying the UTAUT Model) to the use of Blackboard (Course Management Software) found mixed support for the model’s reliability of the scale items representing the UTAUT constructs and the hypothesized relationships. Jong and Wang [17] used a modified UTAUT model to determine technology acceptance of a web-based learning system of Taiwan technical university students. A study conducted in UCSI University to evaluate students’ acceptance of blogging also found strong support for the UTAUT model [18]. El-Gayar and Moran [19] applied a modified UTAUT Model to evaluate students’ acceptance of Tablet PCs as a means to forecast, explain, and improve usage pattern of Tablet PC in education. Yamin and Lee [20] modified UTUAT constructs to determine the Level of Acceptance and Factors Influencing Students’ Intention to Use UCSI University’s E-mail System, which also found strong for the UTUAT model.

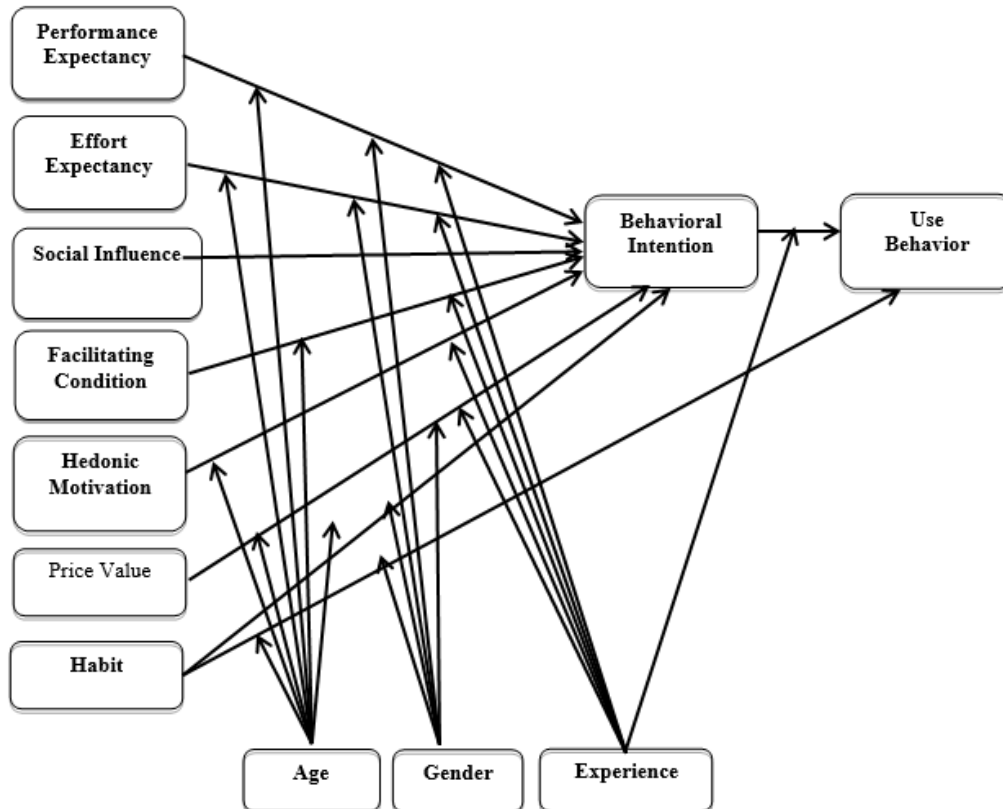


Figure 1: Unified Theory of Acceptance and Use of Technology 2 [21]

Finally, UTAUT fails to capture other important constructs such as technology awareness and attitude [8, 20, 22, 23]. One cannot be talking about technology acceptance without an adequate awareness creation of such technology to its intended users.

3. PROPOSED WORK

This study modified the UTUAT₂ model by adding Technology Awareness as a technology related factor to the UTUAT₂ model as well as adopted Attitude from Theory of Reasoned Action (TRA) [6]. Price was dropped since the technology in question is a free one. The proposed model focused on identifying the relationship between Performance Expectancy, Effort Expectancy, Social Influence, Technology Awareness, Facilitating Conditions, Attitude, Hedonic Motivation and Habit on postgraduate students' intention to use the University e-mail system as shown in figure 2.

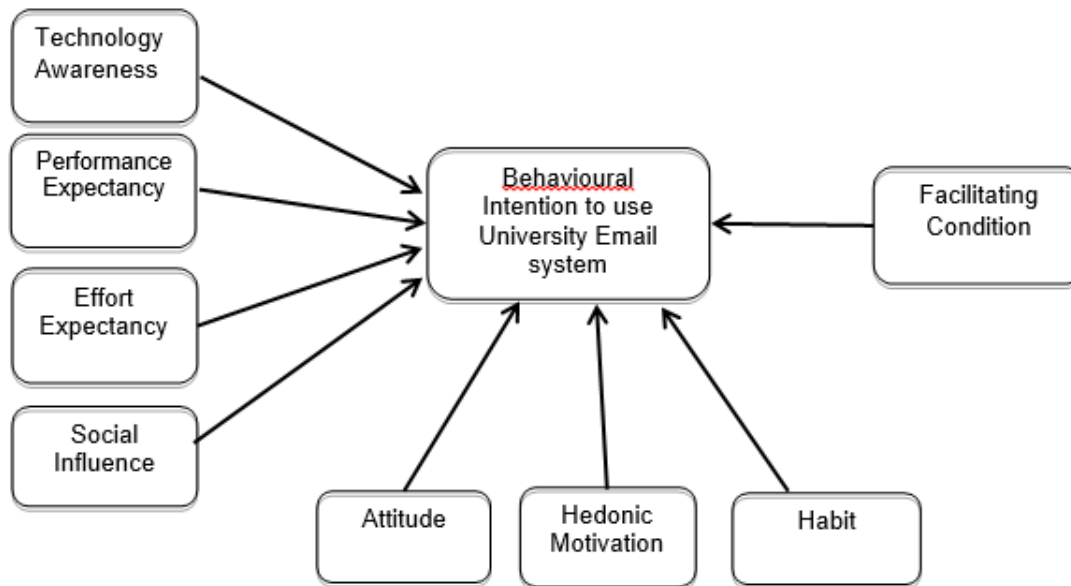


Figure 2: The Proposed model

We did not consider the moderating effect of age, gender, literacy level and Experience in this study because our respondents are all university postgraduate students whose age, literacy level and experience are similar. Table 1 shows the definition of each of the aforementioned constructs as reported in the originating UTAUT study [4, 21].

Table 1: Definition of Constructs

Core Construct	Definitions	References
Performance Expectancy	“The degree to which an individual believes that using the system will help him or her attain gains in job performance”	[4]
Effort Expectancy	“The degree of ease associated with the use of the system”	[4]
Social Influence	“The degree to which an individual perceives that important others believe he or she should use the new system”	[4]
Facilitating Condition	“The degree to which an individual believes that an organizational and technical infrastructure exists to support use of the system”	[4]
Hedonic Motivation	“The degree to which an individual derived fun or pleasure from using a technology”	[21]
Habit	“The degree to which an individual believes the behavior to be automatic”	[21]
Technology Awareness	“Awareness is the state of consciousness or quality of being aware of a product, technology, or new concept.”	[24]
Attitude	“An individual’s positive or negative feelings (evaluative effect) about performing the target behavior”	[6]

4. METHODOLOGY

A. SAMPLE AND METHODS

Sample for this study comprises of three hundred and eight (308) postgraduate students (Post Graduate Diploma, Masters and Doctorate) from thirteen Faculties of the University of Benin, Nigeria. Postgraduate students were chosen because they require University E-mail system for effective communication and collaboration with their supervisors and research colleagues. Questionnaire was developed and distributed to the postgraduate students at their respective faculty locations. Data collected underwent a screening process consisting of many steps, to ensure that subsequent analysis is based on a complete dataset that is void of any issues such as incomplete answers. Descriptive and reliability statistics were implemented using SPSS. The Cronbach's alpha, Mean ratings, Correlation, Multiple Regression of data analysis were therefore adopted as used by several researchers in this line of study [20, 23]. The results were interpreted with regards to the hypotheses raised.

B. RESEARCH INSTRUMENT

The research instrument used for the survey is the questionnaire, tagged University E-Mail System Questionnaire (UESQ). The research questionnaire was mainly based on the constructs of the UTAUT model developed by [21]. The questionnaire consisted of two sections. Part A consisted of demographic information like faculty name, age, gender and academic level. Part B comprised of the questions adopted from the extended UTAUT model. The UTAUT questions in Part B were sub divided into nine sub categories. They were Technology Awareness, Performance Expectancy, Effort Expectancy, Social Influence, Attitude, Hedonic Motivation, Habit, Facilitating Conditions and Behavioral Intention, each covering three questions. A five point Likert scale was used to elicit responses from the respondents.

5. RESULT AND DISCUSSION

A. ANALYSIS OF DEMOGRAPHIC DATA

TABLE 2: Demographics of Respondents

SEX	No.	%
MALE	136	44.2%
FEMALE	172	55.8%
	308	100.0%
AGE		
21-23	77	25.0%
26-30	141	45.8%
31-35	69	22.4%
36-40	17	5.5%
41 & ABOVE	4	1.3%
	308	100.0%
ACADEMIC LEVEL		
PGD	88	28.6%
M.Sc	164	53.2%
Ph.D	56	18.2%
	308	100.0%

Majority of the participants were female postgraduate students totaling to 172 participants (55.87%) while male participants were 109 (30.53%). The mean age of respondents was 25.37 years. Among the participants, most were studying for their Masters' Degree (53.2%) while 28.6% were from the Postgraduate Diploma programmes and 18.2% were studying for their Doctorate Degree as shown in Table 2.

B. REALIBILITY OF RESEARCH VARIABLES

Table 3: Reliability Coefficients of Constructs

Construct	Cronbach's Alpha	Number of Items
Technology Awareness	0.644	3
Performance Expectancy	0.841	3
Effort Expectancy	0.812	3
Social Influence	0.658	3
Attitude	0.754	3
Hedonic Motivation	0.837	3
Habit	0.901	3
Facilitating Condition	0.821	3
Behavioural Intention	0.830	3

The reliability analysis was carried out for the construct using Cronbach's Alpha. [25]. As shown in table 3, several of the constructs are reliable since computed static is above 0.7, which shows that the questions related to the technology acceptance and use is highly reliable. In some other studies, it assumed that score greater than .60 is considered acceptable [23].

C. LEVEL OF ACCEPTANCE OF THE UNIVERSITY E-MAIL SYSTEM

To explore the acceptance level of the e-mail system by University of Benin Postgraduate students, mean ratings were calculated. Table 4 shows the level of acceptance and use of the University E-mail system. The rating on a scale interval of 1(very low) to 5(very high). We observed that the overall acceptance of the e-mail system by respondents was moderate. Moderate scores for constructs such as Performance Expectancy, Attitude, Behavioral Intention and low scores for Hedonic Motivation, Habit indicates that respondents have fairly realized the benefits of the system and it is not a habit to them yet. Hence, postgraduate students did not have a high intention to use the university e-mail system.

Table 4: Students' Level of Acceptance of the University E-Mail System

Constructs	Mean Rating ^a	Level
TECHNOLOGY AWARENESS	2.82	Low
PERFORMANCE EXPECTANCY	3.12	Moderate
EXFORT EXPECTANCY	3.30	Moderate
SOCIAL INFLUENCE	3.23	Moderate
Valid ATTITUDE	3.03	Moderate
HEDONIC MOTIVATION	2.92	Low
HABIT	2.81	Low
FACILITATING CONDITION	3.33	Moderate
BEHAVIOURAL INTENTION	3.11	Moderate

D. CORRELATION AND REGRESSION ANALYSIS

Correlation analysis is a measure of the degree to which a change in the independent variable will result in a change in the dependent variable. Pearson s' Product-Moment Correlation was used to investigate the relationship between the independent variables (Technology Awareness, Performance Expectancy, Effort Expectancy, Attitude, Social Influence, Hedonic Motivation, Habit and Facilitating Conditions) and the dependent variable (Behavioral Intention).

Table 5: Correlation of Students' Adoption Factors

	TA	PE	EE	SI	ATUT	HM	HA	FC	BI
TA	1								
PE	.744**	1							
EE	.374**	.491**	1						
SI	.436**	.477**	.441**	1					
ATUT	.619**	.721**	.443**	.518**	1				
HM	.622**	.737**	.478**	.490**	.733**	1			
HA	.516**	.659**	.337**	.477**	.539**	.712**	1		
FC	.428**	.562**	.581**	.495**	.625**	.639**	.544**	1	
BI	.643**	.803**	.437**	.576**	.735**	.719**	.644**	.645**	1

Note. TA = technology awareness; PE = performance expectancy; EE = effort expectancy; SI = social influence; ATUT = attitude; HM = hedonic motivation; HA = habit; FC = facilitating conditions; BI = behavior intention.

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

Table 5 shows the correlation of students' adoption factors. According to the correlation analysis, Technology Awareness, Performance Expectancy, Social Influence, Attitude, Hedonic Motivations, Habit and Facilitating Conditions, was positively correlated with students Intention where correlation coefficient was equal to 0.643, 0.803, 0.576, 0.735, 0.719, 0.644, and 0.645 respectively. However, Effort Expectancy has insignificant values since the correlation between independent variables and behavioural intention (dependent variable) was near to no relation.

Table 6 shows the regression analysis of students' adopted variables. The result shows that Performance Expectancy has the largest value ($\beta = 0.446$, $t = 7.917$, $p < 0.001$) indicating that Performance Expectancy had the highest impact among the independent variables in determining behavioral intention to use e-mail system. Facilitating Condition had the second highest value ($\beta = 0.184$, $t = 4.144$, $p < 0.001$), followed by Attitude ($\beta = 0.164$, $t = 3.306$, $p < 0.01$), Social Influence ($\beta = 0.156$, $t = 4.232$, $p < 0.001$) while Technology Acceptance, Effort Expectancy and Hedonic Motivation, Habit has insignificant values since the correlation between the independent variables and behavioural intention (dependent variable) was near to no relation.

Table 6: Regression of Students' Adoption Factors

	B	t-value
Technology Awareness	0.028	0.634
Performance Expectancy	0.446	7.917***
Effort Expectancy	-0.089	-2.339
Social Influence	0.156	4.232***
Attitude	0.164	3.306**
Hedonic Motivation	0.057	1.034
Habit	0.063	1.401
Facilitating Condition	0.183	4.144***
R ²		0.747
Adjusted R ²		0.741

** $p < .01$, *** $p < .001$ Dependent Variable: BI

The Beta values showed the rate of change in independent variable will cause the change in the dependent variable. Next, the R² value of 0.747 indicates that 74.7% of the variance in behavioral intention can be explained by the model.

6. CONCLUSION AND RECOMMENDATION

The study explored the level of acceptance of the University E-mail system and factors affecting postgraduate students' acceptance and intention to use of University E-mail system in terms of the relationships among determinants of modified UTAUT₂ model usage intention by [21]. The findings indicated that the significant predictors of postgraduate students' intentions to use University E-mail system in order of relevance are performance expectancy, facilitating condition, social influence and attitude. Technology awareness, effort expectancy, hedonic motivation and habit have insignificant values since their p-values are greater than 0.05. Thus, postgraduate students' usage behavior depends on the improved level of performance expected by its usage, facilitating conditions, influence of the social circle and positive attitude towards it. It is recommended that the benefits of the new e-mail system should be promoted to the students for them to accept the system. Further studies can expand this research by including the moderating variables in the UTAUT2 model (e.g., gender, age, Literacy level), that were excluded in our study.

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