THE INTERNATIONAL JOURNAL OF SCIENCE & TECHNOLEDGE

Assessment of Lecturers' Acceptance and Adoption of ICT in Teaching and Learning Process in Nigerian Universities

Ayoade Olusola Bamidele

Principal Lecturer, Department of Computer Science
Emmanuel Alayande College of Education, Oyo, Oyo State, Nigeria

Abstract:

This study examined lecturers' acceptance and adoption of ICT in teaching and learning process in some selected Nigerian universities. A descriptive survey design was employed and an adapted questionnaire was used to collect data from the respondents. The population of the study consists of all the lecturers in the selected universities. An incidental random sampling technique was used to select one thousand (1000) respondents from the population of the study. Three research questions and five hypotheses were formulated for the study. Out of the 1000 questionnaires administered on the sample of the study, only 980 were returned. Data collected were analysed using simple percentage, frequency count, Cronbach's Alpha and multiple regression analysis at 0.05 level of significant. The results of the study showed that lecturers' level of adoption of the ICT in teaching and learning process is high (66.0%). The results also showed that all the barriers affect the use of ICT in teaching and learning process, but, Lack of administrative support (88.8%), Lack of reliable educational support software (88.0%), Absence of ICT policy guidelines (85.1%), High cost of ICT installation and maintenance (80.2%) and Poor state of ICT interconnectivity (80.0%) are mostly affecting the use of ICT in teaching and learning process. The results also indicated that Performance Expectancy ($\beta=.373$, $p=.000$), Effort Expectancy ($\beta=.182$, $p=.000$) and Social Influence ($\beta=.104$, $p=.000$) were the influential factors for the acceptance and adoption of the use of ICT in teaching and learning process while Performance Expectancy is the most influential factor out of the three and all the moderating variables (i.e. gender, age, year of teaching experience and teaching subject) have significant effects on the performance expectancy, effort expectancy and social influence. Notably, female lecturers, lecturers within the age range of 35 and 44 years, 21 years and above teaching experience and lecturers who were teaching ICT related courses such as Information Sciences, Engineering, Computer Science and Informatics had high efficacy for use of ICT in teaching and learning process. The model explains approximately 37% of the variance in behavioural intention (adjusted $R^2=.370$). The study recommends that government should formulate and ensure proper implementation of ICT policies that will enhance the use of ICT for teaching and learning process. Also, government should allocate sufficient funds for the procurement, installation and maintenance of ICT based system. Finally, the university management should provide adequate administrative and technical support for the lecturers on the use of ICT.

Keyword: Effort expectancy, facilitating condition, ICT, performance expectance, social influence, UTAUT

1. Introduction

Today's education has taken various shapes, especially this time the language that is spoken by most of the learners and individuals is based on ICTs i.e. information and communication technologies (Sachin, Patil Vidyapeeth and Razdan, 2015). IT provides a platform like online discussion forum where students and teachers can easily interact with one another without any limitation. The application of ICT in teaching and learning have change education service delivery to becomes less about teaching and more about learning (less "magister-centric" and more "learner-centric" via self-tutoring and the use of individualized information research abilities); increasingly less confined within the sole geographical location of learners (a country) or less dependent upon a physical space (a classroom for pooling a critical mass of learners together); and more flexible, adjustable to learners' chosen time, with modular curricula no longer constrained by rigidly formatted schooling path or by rigidly predetermined certification goals (Nchunge, Sakwa and Mwangi, 2013).

The pedagogical and socio-economic forces that have driven the higher learning institutions to adopt and incorporate ICTs in teaching and learning include greater information access; greater communication; synchronous and asynchronous learning; increased cooperation and collaboration, cost-effectiveness and pedagogical improvement (Sife, Lwoga and Sanga, 2007). Information and communication technology are used as an umbrella term that includes any communication device or application, encompassing: radio, television, cellular phones, computer and network hardware and software, satellite systems, as well as the various services and applications associated with them, such as videoconferencing and distance learning (Sara, et al. 2010).

The introduction of ICT into universities clearly changed the way education is conducted and paves way for a new pedagogical approach, where students are expected to get more involved in the learning process, being active participants of knowledge creation not mere recipients of knowledge (Hamilton_Ekeke and Mbachu, 2015). Using information and

known ICT tools in education, students should be able to communicate, create preservatives in PowerPoint, and interact with colleagues and teachers using technology.

While there is a wide range of innovations in ICT to support effective and quality delivery of education services and curricula, there is a considerable technology lag in educational institutions (Nchunge, Sakwa and Mwangi, 2013). Also, despite many interventions by management and governments to support the use of ICTs in the teaching and learning activities in higher education institutions, studies have shown that the adoption and use of ICTs by academics to deliver their teaching still remains low. Most institutions still use nearly obsolete systems and are consequently unable to exploit the educational potential of the emerging technologies (Nchunge, Sakwa and Mwangi, 2013). According to Sife, Lwoga and Sanga (2007) level of ICT adoption in many developing countries is low due to socioeconomic and technological challenges including lack of a system approach to learning, awareness and attitudes towards ICTs, administrative and technical support, staff development, and lack of ownership, inadequate funds, and transforming higher education.

Oduma (2013) likened ICT to a utility like water and electricity which plays a major role in education and has impacted on the quality and quantity of teaching and learning as well as research in educational methodology to initiate a new age in education. Internet as a digital tool of ICT has strengthen teaching and learning as it provides powerful resources and services for students, thereby enabling them meet their educational needs, it also allows for networking among students and teachers to facilitate exchange of ideas and improve opportunities for connecting schools to the world as learning is expanding beyond the classroom, so real life context can be established (Dotimi and Hamilton-Ekeke, 2013).

Etim, Akpan, and Ibok (2013) defined the internet as the inter connection of system of subsystems of equipment that is used in the automatic acquisition, storage, manipulation, management, movement, control, display, switching, interchange, transmission or reception of data or information. Dickson (2012) noted that the internet can be seen to provide resources and services that are used for accessing, processing, gathering, manipulation and presenting or communicating information. The use of internet in education is now growing in all parts of the world and their application is becoming an integral part of education in many parts of the globe.

Achimugu, Oluwagbemi, Oluwaranti and Afolabi (2009) opined that the adoption of Information Technology (IT) successfully in developing countries is one of the most pressing current developmental issues. Since IT became commercial in the early 1990s, it has diffused rapidly in developed countries but generally slowly in developing ones. Nigerian universities are focusing on curricula that might contribute more directly to economic growth and network as in the case of Nigeria today, individuals may not use ICT service for different reasons ranging from lack of interest, illiteracy, lack of awareness, exorbitant rate of services, poor quality of service and low per capita income (Oye, Aiahad and Ab.raham, 2011). Said, Lin and Jim (2009) investigated the perceived barriers to adopting ICT in Omani higher education. The findings show that the faculty members perceived moderate degrees of barriers in applying ICT to their teaching practices. According to Chiemeke and Longe (2007), the United Nations identified four major sets of indicators for complete information technology diffusion in a country as follows: (a) ICT infrastructure and access. (b) Access to and use of ICT by households and individuals. (c) Use of ICT by businesses and (d) ICT sector and trade in ICT goods.

Bridget (2008) opined that pedagogical adoption of ICT is complex and requires an integration of vision, system-wide experimentation and new roles and relationships for teachers and students. Let us not forget that classrooms have never been ideal learning environments and teachers in public education systems have always been somewhat burdened by working with students who are there under compulsion (Oye, Aiahad and Ab.raham, 2011). ICTs can help to make schools less-stressful workplaces for both teachers and students. The rapid diffusion of the Internet has not only generated a renewed interest in the role of new information and communication technologies (ICTs) in higher education and learning, but it has also affected the ways people teach and learn (DeLacey and Leonard, 2002). At the same time, there has been growing concern over the possible decline of traditional practices and institutions, as e-learning, virtual universities, and distance education become feasible alternative platforms for higher education. Students, teachers, and administrators have continued to employ the Internet and Web for their practices, and e-learning have remained a key item on educational agendas (Oye, Aiahad and Ab.raham, 2011).

Several studies that assessed the rate of adoption of ICT in the learning and teaching have been conducted in Universities worldwide and in Africa. For example, Oye, Aiahad and Ab.raham (2011) conducted a study that focused on the awareness, adoption and acceptance of ICT innovation in higher education institutions at the University of Jos, in Nigeria. The study revealed that although the use of ICT is mandatory, however the level of adoption among the university academic staff is still low. The researchers outlined the challenges to ICT usage among academic staff and they ranged from, lack of funds, no opportunity for training, lack of sponsorship by the school management, inability to acquire personal ICT facilities, no ICT facilities at workplace, poor electricity supply, lack of ICT knowledge, insufficient time due to workload, lack of interest in learning, and lack of time for practice.

Chaputula (2012) conducted a study that assessed the state, adoption and use of ICTs by students and academic staff at Mzuzu University in Malawi. The study showed that the state of ICTs at Mzuzu University was poor but the adoption and use of ICTs was high. The attributed obstacles to the adoption and use of ICTs by the academics and researchers included poor network infrastructure, the limited number of computers, and the high cost of internet access, persistent power outages, and the lack of relevant ICT skills, among others. This study attributed the adoption level to limited ICT infrastructure. Also, Yeboah, Kwame and Kyere-Djan (2013) conducted a study that looked at the Factors Affecting ICT Adoption in Tertiary Institutions in Ghana: A Case of Kwame Nkrumah University of Science and Technology. The study showed that perceive usefulness and ease of use is a primary factor driving ICT adoption. The study also revealed that ICT is not fully integrated in teaching, research and learning at KNUST. A major obstacle is that though most

users are aware of the potential benefits they are not ready or unwilling to fully embrace ICT. Several factors were also identified including inadequate infrastructure and skills to use ICT.

Samuel and Hillar (2014) review obstacles which inhibit adoption of ICT in higher educational institutions and the results of the study identified lack of institutional support, financial support, time to learn new technologies, access to computing, technical support and training. Other obstacles identified were technology reliability, uncertainty about its worth, resistance to change, negative attitude, awareness, relevance, ease of use, attitude of organization, and computer literacy. Chumo and Kessio (2015) conducted a study that used UTAUT model to assess ICT adoption in Kenyan Public Universities. The results indicated that effort expectancy, performance expectancy and social influence factors affect the student's behavioural intention, which ultimately affects adoption of web-based information system. Lastly, Shumba and Chaamwe (2016) conducted a study to investigate the state and use of ICTs by Academic staff of Copperbelt University in Zambia. The results of the study showed that adoption of ICT tools by Academic staff in their teaching and learning activities at the Copperbelt University is low. Obstacles responsible for the low levels of adoption identified as lack of administrative support and minimum technology support.

Several models have been developed for better understanding and investigation of factors that affect the computer technology acceptance like TRA (theory of reasoned action), the theory of planned behaviour, the technology acceptance model i.e. TAM. TAM examines the mediating role of perceived ease of use and perceived usefulness in their relation between systems characteristics (external variables) and the probability of system use (an indicator of system success). A key purpose of TAM is to provide a basis for tracing the impact of external variables on internal beliefs, attitudes, and intentions. It suggests that perceived ease of use (PEOU), and perceived usefulness (PU) are the two most important factors in explaining system use. (Legris, Ingham and Collette, 2003). TAM is as shown in figure 1 below.

Figure 1: Technology Acceptance Model (TAM)

TAM 2 extended the original TAM model to explain perceived usefulness and usage intentions in terms of social influence and cognitive instrumental processes. TAM2 differs from the original TAM model by adding three additional variables: "subjective norm", "voluntariness", and "image" (Davis and Venkatesh, 2000). TAM2 is as shown in figure 2 below.

Figure 2: Technology Acceptance Model 2 (TAM2)

However current research used UTAUT model to evaluate the factors that predict the acceptance and adoption of the use of ICT by the lecturers in Nigerian Universities. The UTAUT model is based on eight technology acceptance theories and models including Theory of Reasoned Action (TRA), the Motivation Model, the Technology Acceptance Model (TAM), the Theory of Planned Behaviour (TPB), the model of Personal Computer Utilization, the Social Cognitive Theory and the Innovation Diffusion Theory (Venkatesh, Morris, Davis and Davis, 2003). The UTAUT model for this study was adopted from Venkatesh et al. (2003) and it is shown in figure 3. The theory comprises of four independent variables:

- Performance Expectancy: The degree to which lecturer believes that the use of ICT will enhance his/her teaching.

- Effort Expectancy: The degree of ease associated with the use of the ICT.
- Social Influence: The extent to which the lecturers believe that important others believe that they should use the ICT.
- Facilitating Conditions: The perceived extent to which the college and technical infrastructure required support the use of ICT.

Figure 3: UTAUT Model of the Study Adopted from Venkatesh Et Al. (2003)

The model also comprised of the following moderating variables; gender, age, year of experience and teaching subject which affect the performance of the factors. In the UTAUT model, performance expectancy, effort expectancy and social factors variables have direct effects on the behavioural intention which in turn impacts the use behaviour. However, facilitating conditions variable has direct effect on the use behaviour. The effect of facilitating conditions on behavioural intention is not considered because it is assumed non-significant when both performance expectancy and effort expectancy have been included (Venkatesh et al., 2003; Schepers and Wetzels, 2007). These factors affect the use behaviour and subsequently the acceptance and adoption of the use of ICT in teaching and learning process that was the dependent variable in this study.

1.1. Objectives of the Study

This research aims to examine the lecturers' acceptance and adoption of the use of ICT in Nigerian Universities. Specifically, the study investigated:

- The lecturers' level of adoption of the use of ICT in teaching and learning process
- The most influential factors for the acceptance and adoption the use of ICT by the lecturers in
- Teaching and learning process
- The barriers that affect lecturers' use of ICT in teaching and learning process

1.2. Research Questions

- What is the lecturers' level of adoption of the use of ICT in teaching and learning process?
- What are the barriers that affect lecturers' use of ICT in teaching and learning process?

1.3. Hypotheses

The following hypothesis was formulated and tested for this study:

- H1: There would be a significant positive relationship between Performance Expectancy and behavioural intentions to use ICT, and this relationship would be moderated by gender and age.
- H2: There would be a significant positive relationship between Effort Expectancy and behavioural intentions to use ICT, and this relationship would be moderated by gender, age and year of teaching experience.
- H3: There would be a significant positive relationship between performance Social Influence and behavioural intentions to use ICT, and this relationship would be moderated by gender, age, year of teaching experience and teaching subject.
- H4: There would be a significant positive relationship between Facilitating Condition and use behaviour, and this relationship would be moderated by year of experience.
- H5: There would be a significant positive relationship between Performance Expectancy, Effort Expectancy, Social Influence and behavioural intentions to use ICT, and this relationship would be moderated by gender, age, year of teaching experience and teaching subject.

2. Research Methodology

The descriptive research design of the survey type was employed in the study. The population of the study consisted of all lecturers in five universities selected in South West Zone of Nigeria (i.e. Ladoke Akintola University of

Technology, Ogbomoso, University of Ibadan, Ibadan, Obafemi Awolowo University, Ile-Ife, Federal University of Agriculture, Abeokuta and Osun State University, Osogbo). An incidental random sampling technique was used to select one thousand lecturers. Two hundred lecturers were selected from each university. An adapted questionnaire was used to collect data. The questionnaire was tagged "Lecturers Acceptance and Adoption of the use of ICT in Nigerian Universities". The questionnaire was made up of four sections. Section A focused on demographic data which includes gender, age, year of experience and teaching subject. Section B focused on level of adoption of the use of ICT tools in teaching and learning process. The section contained ten (10) items and the response mode are "Very Great Extent (VG)", "Great Extent (G)", "Low Extent (L)" and "Very Low Extent (VL)". Section C contained ten items (10) on barriers affecting the use of ICT in teaching and learning process and the response mode are "SA", "A", "D" and "SD". Section D of the questionnaire which contained twenty-seven (27) items addressed the factor influence the acceptance and use ICT by the lecturers in teaching and learning process and the Likert response mode of "SA", "A", "D" and "SD". The face and content validity of the questionnaires was ascertained by experts in Test and Measurement. A sample of eighty respondents was selected apart from the selected sample and the questionnaire was administered on them to carryout test-retest analysis. The reliability coefficient was calculated to be 0.859 using the Cronbach's Alpha on the data collected. The instrument was administered personally by the researcher on the sample respondents through the help of lecturers from each university. Only 980 copies of the completed questionnaire were retrieved from the sample respondents to give 98% return rate. Therefore, nine hundred (900) questionnaires were used and analyse with Statistical Package for Social Sciences (SPSS) package 20.0. In this study, the statistical techniques adopted are simple percentage, frequency count, Cronbach's Alpha, and regression analysis at 0.05 level of significant.

2.1. Result

Demographic	Frequency	Percentage
Gender		
Male	563	57.4
Female	417	42.6
Age		
25-34 years	224	22.9
35-44 years	231	23.6
45-54 years	262	26.7
55 years and above	263	26.8
Year of Teaching Experience		
1-10 years	221	22.6
11-20 years	394	40.2
21years and Above	365	37.2
Teaching Course		
English and Literary Studies	93	9.5
Linguistics and Nigerian Language	72	7.3
Mass Communication	84	8.6
Theatre and Film Studies	51	5.2
Biochemistry	74	7.6
Accountancy	60	6.1
Business Administration	47	4.8
Library and Information Science	45	4.6
Science Education	61	6.2
Architecture	65	6.6
Urban and Regional Planning	51	5.2
Electrical/Electronic Engineering	26	2.7
Computer Science	32	3.3
Medical Laboratory Science	38	3.9
Private and Public Law	22	2.2
Anatomy	20	2
Pure and Industrial Chemistry	21	2.1
Economics	36	3.7
Philosophy	42	4.3
Psychology	40	4.1

Table 1: Demographic Data of the Lecturers

Source: Field Survey, 2017

Table 1 showed the demographic information of the students. The table indicates that 57.4% of the lecturers were male while 42.6% were female; this shows that male was more represented than female participants. In terms of their age 22.9% were their age is between 25 years and 34 years, 23.6% were their age is between 35 years and 44 years, 26.7%

were their age is between 45 years and 54 years while 26.8% were their age above 54 years. In terms of years of teaching experience, 22.6% were their teaching experience is between 1 year and 10 years, 40.2% were their teaching experience is between 11 years and 20 years while 37.2% were their teaching experience is 21 years and above. Finally, with regards to course teaching, only twenty (20) departments were involved and the three departments which are mostly represented are English and Literary studies (9.5%), Mass Communication (8.6%) and Biochemistry (7.6%).

- Research Question1: What is the lecturers' level of adoption of the use of ICT in teaching and learning process?

Items	Frequency & Percentage			
	VG	G	L	VL
Use the Internet to obtain teaching resources	394(40.2%)	381(38.9%)	119(12.1%)	86(8.8%)
I prepare notes for my students with the Internet	328(33.5%)	281(28.7%)	187(19.1%)	184(18.8%)
Set computer based assignment	365(37.2%)	352(35.9%)	146(14.9%)	117(11.9%)
Create lessons that incorporate students' use of a digital video, graphics or sound editors	210(21.4%)	279(28.5%)	312(31.8%)	179(18.3%)
Use email to communicate with students and other teachers	474(48.4%)	399(40.7%)	44(4.5%)	63(6.4%)
I use computer as tool to teach new subject knowledge	240(24.5%)	355(36.2%)	179(18.3%)	206(21.0%)
Use email to communicate with parents' of the student	283(28.9%)	341(34.8%)	205(20.9%)	151(15.4%)
Use software to monitor the students' scores	199(20.3%)	177(17.8%)	296(30.2%)	311(31.7%)
Use Interactive Whiteboards	365(37.2%)	455(46.4%)	95(9.7%)	65(6.6%)
Use subject specific software	244(24.9%)	348(35.5%)	184(18.7%)	204(20.8%)

Table 2: Lecturers' Level of Adoption of the Use of ICT in Teaching and Learning Process (N=980)
Source: Field Survey, 2017

The results in Table 2 indicated that the lecturers' level of adoption of the use of ICT in teaching and learning process is high (66.0%) but the use of software to monitor their students' scores is very low (38.1%) also the use of ICT to create lessons that incorporate students' use of a digital video, graphics or sound editors is moderate (50.0%).

- Research Question 2: What are the barriers that affect lecturers' use of ICT in teaching and learning process?

Items	Frequency & Percentage			
	SA	A	D	SD
Lack of Administrative support	406(45.1%)	393(43.7%)	66(7.3%)	35(3.9%)
Minimum Technical support	301(30.7%)	479(48.9%)	138(14.1%)	62(6.3%)
Lack of reliable educational support software	393(40.1%)	469(47.9%)	73(7.4%)	45(4.6%)
Poor state of ICT interconnectivity	311(31.7%)	473(48.3%)	116(11.8%)	80(8.2%)
Low Internet access	316(32.2%)	389(39.7%)	139(14.2%)	136(13.9%)
Lack of appropriate electronic educational contents	377(38.5%)	401(40.9%)	163(16.6%)	39(4.0%)
Absence of ICT policy guidelines	409(41.7%)	425(43.4%)	81(8.3%)	65(6.6%)
High cost of ICT installation and maintenance	293(29.9%)	493(50.3%)	115(11.7%)	79(8.1%)
Lack of adequate ICT facilities and equipment	308(31.4%)	389(39.7%)	144(14.7%)	139(14.2%)
Poor electricity supply	262(26.7%)	437(44.6%)	200(20.4%)	81(8.3%)

Table 3: Barriers Affecting the Use of ICT in Teaching and Learning Process (N=980)
Source: Field Survey, 2017

Table 3 showed the responses of the lecturers on the barriers affecting the use of ICT in teaching and learning process. Their responses indicated that all the barriers affect the use of ICT in teaching and learning process. But, Lack of administrative support (88.8%), Lack of reliable educational support software (88.0%), Absence of ICT policy guidelines (85.1%), High cost of ICT installation and maintenance (80.2%) and Poor state of ICT interconnectivity (80.0%) are mostly affecting the use of ICT in teaching and learning process.

- Hypothesis 1: There would be a significant positive relationship between Performance Expectancy and behavioural intentions to use ICT, and this relationship would be moderated by gender and age.
-

Model	B	Std. Error	Beta	t	Sig. value
1 (Constant)	4.175	.428		9.762	.000
Performance Expectancy	.468	.026	.518	17.931	.000
Gender	-.376	.118	-.088	-3.189	.001
Age	-.070	.055	-.037	-1.279	.201
R	.525	R ²	.275	Adjusted R Square	.273
				Std. Error of the Estimate	1.800

Table 4: Regression Model for Performance Expectancy and the Moderating Variables (Gender and Age) against Behavioural Intention
Source: Field Survey, 2017

The first stepwise regression model (Table 4) is used to test the hypotheses one (H1). The model explains approximately 27% of the variance in behavioural intention (adjusted R²=.273).

Performance Expectancy ($\beta=.518$, $p=.000$) was found to influence behavioural intention. In addition, among the two moderating variables, only gender was found to have a significant effect on the relationship that performance expectancy had with behavioural intention. The results provide a partial support for the acceptance of H1. Therefore, performance expectancy has a significant positive effect on the behavioural intention to use ICT in teaching and learning process and that effect is stronger for female lecturers.

- Hypothesis 2: There would be a significant positive relationship between Effort Expectancy and behavioural intentions to use ICT, and this relationship would be moderated by gender, age and year of teaching experience.

Model	B	Std. Error	Beta	t	Sig. value
1 (Constant)	6.071	.504		12.054	.000
Effort Expectancy	.403	.030	.419	13.423	.000
Gender	-.411	.124	-.096	-3.305	.001
Age	-.073	.058	-.039	-1.267	.206
Year of Teaching Experience	-.436	.079	-.157	-5.497	.000
R	.469	R ²	.220	Adjusted R Square	.217
				Std. Error of the Estimate	1.868

Table 5: Regression Model for Effort Expectancy and the Moderating Variables (Gender, Age and Year Of Teaching Experience) Against Behavioural Intention
Source: Field Survey, 2017

The second stepwise regression model (Table 5) is used to test the hypotheses two (H2). The model explains approximately 22% of the variance in behavioural intention (adjusted R²=.217).

Effort Expectancy ($\beta=.419$, $p=.000$) was found to influence behavioural intention. In addition, among the three moderating variables, both gender and year of teaching experience was found to have a significant effect on the relationship that effort expectancy had with behavioural intention. The results provide a partial support for the acceptance of H2. Therefore, effort expectancy has a significant positive effect on the behavioural intention to use ICT in teaching and learning process and that effect is stronger for female lecturers and lecturers with teaching experience of 21 years and above.

- Hypothesis 3: There would be a significant positive relationship between Social Influence and behavioural intentions to use ICT, and this relationship would be moderated by gender, age, year of teaching experience and teaching course.
-

Model	B	Std. Error	Beta	t	Sig. value
1 (Constant)	12.408	.490		25.327	.000
Social Influence	.068	.028	.076	2.470	.014
Gender	-.053	.129	-.012	-.408	.683
Age	-.465	.057	-.245	-8.127	.000
Year of Teaching Experience	-.746	.084	-.269	-8.844	.000
Teaching Course	-.109	.011	-.300	-9.850	.000
R	.408	R ²	.166	Adjusted R Square	.162
				Std. Error of the Estimate	1.932

Table 6: Regression Model for Social Influence and the Moderating Variables (Gender, Age, Year of Teaching Experience and Teaching Course) Against Behavioural Intention
Source: Field Survey, 2017

The third stepwise regression model (Table 6) is used to test the hypotheses three (H3). The model explains approximately 16% of the variance in behavioural intention (adjusted $R^2=.162$).

Social Influence ($\beta=.076$, $p=.000$) was found to influence behavioural intention. In addition, among the four moderating variables, only gender was found not to have a significant effect on the relationship that social influence had with behavioural intention. The results provide a partial support for the acceptance of H3. Therefore, social influence has a significant positive effect on the behavioural intention to use ICT in teaching and learning process and that effect is stronger for lecturers which their age is between 35 and 44 years, lecturers with 21 years and above teaching experience and lecturers teaching ICT related courses.

- Hypothesis 4: There would be a significant positive relationship between Facilitating Condition and use behaviour, and this relationship would be moderated by age and year of teaching experience.

Model	B	Std. Error	Beta	t	Sig. value
1 (Constant)	12.461	.640		19.477	.000
Facilitating Condition	.039	.020	.066	2.001	.006
Age	-.160	.068	-.077	-2.360	.018
Year of Teaching Experience	-.364	.097	-.119	-3.751	.000
R	.174				
R ²	.030				
Adjusted R Square	.027				
Std. Error of the Estimate	2.287				

Table 7: Regression Model for Facilitating Condition and The Moderating Variable (Year of Teaching Experience) Against Use Behaviour
Source: Field Survey, 2017

The fourth stepwise regression model (Table 7) is used to test the hypotheses four (H4). The model explains approximately 3% of the variance in use behavioural intention (adjusted $R^2=.027$).

Facilitating Condition ($\beta=.066$, $p=.006$) was found to influence use behaviour. In addition, the moderating variables, age and year of teaching experience was found not to have a significant effect on the relationship that facilitating condition had with use behaviour. The results provide a partial support for the acceptance of H4. Therefore, facilitating condition has a significant positive effect on the use behaviour to use ICT in teaching and learning process and that effect is stronger for lecturers which their age is between 35 and 44 years and the year of teaching experience is 21 years and above.

- Hypothesis 5: There would be a significant positive relationship between Performance Expectancy, Effort Expectancy, Social Influence and behavioural intentions to use ICT, and this relationship would be moderated by gender, age, year of teaching experience and teaching subject.

Model	B	Std. Error	Beta	t	Sig. value
1 (Constant)	4.414	.615		7.173	.000
Performance Expectancy	.337	.030	.373	11.123	.000
Effort Expectancy	.175	.033	.182	5.333	.000
Social Influence	.095	.024	.104	3.893	.000
Gender	-.355	.114	-.083	-3.106	.002
Age	-.122	.054	-.064	-2.270	.023
Year of Teaching Experience	-.531	.074	-.191	-7.163	.000
Teaching Course	-.086	.010	-.236	-8.810	.000
R	.612				
R ²	.375				
Adjusted R Square	.370				
Std. Error of the Estimate	1.675				

Table 8: Regression Model for Performance Expectancy, Effort Expectancy, Social Influence and the Moderating Variables (Gender, Age, Year of Teaching Experience and Teaching Subject) Against Behavioural Intention
Source: Field Survey, 2017

The fifth stepwise regression model (Table 8) is used to test the hypotheses five (H5). The model explains approximately 37% of the variance in behavioural intention (adjusted $R^2=.370$).

Performance Expectancy ($\beta=.373$, $p=.000$), Effort Expectancy ($\beta=.182$, $p=.000$) and Social Influence ($\beta=.104$, $p=.000$) was found to influence behavioural intention to use ICT. In addition, all the four moderating variables were found to have a significant effect on the relationship that performance expectancy, effort expectancy and social influence had with behavioural intention. The results provide a partial support for the acceptance of H5. Therefore, performance expectancy, effort expectancy and social influence have a significant positive effect on the behavioural intention to use ICT in teaching and learning process and that effect is stronger for female lecturers, lecturers with age range of 35 and 44 years, lecturers with 21 years and above teaching experience and lecturers teaching ICT related courses.

2.2. Discussion of the Findings

The results of the study in Table 2 showed that lecturers' level of adoption of the use of ICT in teaching and learning process is high (66.0%). This result is in line with the findings of (Oye, Aiahad and Ab.raham, 2011; Chaputula,

2012; Yeboah, Kwame and Kyere-Djan, 2013) that found that the use of ICT by the lecturers is very high. The findings of this study contradict the findings of Shumba and Chaamwe (2016) which conducted study that investigate the state and use of ICTs by Academic staff of Copperbelt University in Zambia. The results of the study showed that adoption of ICT tools by Academic staff in their teaching and learning activities at the Copperbelt University is low. The findings as shown in Table 3 revealed that all the barriers studied affecting the use of ICT in teaching and learning process but, Lack of administrative support (88.8%), Lack of reliable educational support software (88.0%), Absence of ICT policy guidelines (85.1%), High cost of ICT installation and maintenance (80.2%) and Poor state of ICT interconnectivity (80.0%) are mostly affecting the use of ICT in teaching and learning process. These findings are similar to the findings of (Oye, Aiahad and Ab.raham, 2011; Chaputula, 2012; Yeboah, Kwame and KyereDjan, 2013; Samuel and Hillar, 2014; Shumba and Chaamwe, 2016).

The results in Table 4 showed that performance expectancy has a significant positive effect on the behavioural intention to use ICT in teaching and learning process and out of the two moderating variables (i.e. age and gender) only gender was found to have a significant effect on the relationship that performance expectancy had with behavioural intention. This finding is similar to the findings of Yeboah, Kwame and Kyere-Djan (2013) that founds that perceived usefulness and ease of use as a primary factor driving ICT adoption. Also, the finding of this study corroborates the findings of Chumo and Kessio (2015) which concluded that effort expectancy, performance expectancy and social influence affect the students' behavioural intention. The finding of this study in relating to moderating variables contradicted the findings of Azlina, Razak and Abdulla (2013) that founds that both age and gender had no significant correlation with performance expectancy.

Also, the results in Table 5 showed that effort expectancy has a significant positive effect on the behavioural intention to use ICT in teaching and learning process and out of the three moderating variables (i.e. age, gender and year of teaching experience), both gender and year of teaching experience was found to have significant effect on the relationship that effort expectancy had with behavioural intention. This finding is in line with the findings of Oye, Aiahad and Ab.raham (2011) but contradicts the findings of (Chimo and Kessio, 2015) which founds that the three moderating factors age, gender and year of study did not have any significant effect on effort expectancy.

In addition, the results in Table 6 showed that social influence has a significant positive effect on the behavioural intention to use ICT in teaching and learning process and out of the four moderating variables (i.e. age, gender year of teaching experience and teaching course), age, year of teaching experience and teaching subject was found to have significant effect on the relationship that social influence had with behavioural intention. This finding is in line with the findings of Oye, Aiahad and Ab.raham (2011) but contradicts the findings of (Chimo and Kessio, 2015) which founds that age, gender and year of study did not have any significant effect on social influence but course of study has significant effect on social influence.

The results in Table 7 showed that facilitating condition has a significant positive effect on the use behaviour and both the two moderating variables (i.e. age and year of teaching experience) was found to have significant effect on the relationship that facilitating condition had with use behaviour. This finding is in line with the findings of (Oye, Aiahad and Ab.raham, 2011; Nassuora, 2013; Azlina, Razak and Abdulla, 2013; Chimo and Kessio, 2015) which founds that age, gender and year of study have any significant effect on facilitating condition.

Finally, the results in Table 8 showed that performance expectancy is the most influential factor for the acceptance and adoption of the use of ICT in teaching and learning process and all the moderating variables (i.e. gender, age, year of teaching experience and teaching subject) have significant effects on the performance expectancy, effort expectancy and social influence. This finding contradicts the findings of Chimo and Kessio (2015) which founds that effort expectancy is the most influential factor for the acceptance and adoption of the use of web based information system and only course of study out of four moderating variables (i.e. gender, age, year of study and course of study) had significant effect on intention of adoption of web based information system.

3. Conclusion

The study focuses on the lecturers' acceptance and adoption of the use of ICT in teaching and learning process in Nigerian universities. A pilot study was conducted at the five universities in south west zone in Nigeria (i.e. Ladoke Akintola University of Technology, Ogbomosho, University of Ibadan, Ibadan, Obafemi Awolowo University, Ile-Ife, Federal University of Agriculture, Abeokuta and Osun State University, Osogbo) to verify the objectives of the study. It was discovered that the level of adoption among the university academic staff is high. The barriers to ICT usage among academic staff ranges from, Lack of Administrative support, Minimum Technical support, Lack of reliable educational support software, Poor state of ICT interconnectivity, Low Internet access, Lack of appropriate electronic educational contents, Absence of ICT policy guidelines, High cost of ICT installation and maintenance, Lack of adequate ICT facilities and equipment, Poor electricity supply

Also, results indicated that performance expectancy, effort expectancy and social influence affect the lecturer's behavioural intention, which ultimately affects adoption of the use ICT in teaching and learning process. The model explained 37.0% of the variance of the lecturer's behavioural intention to use ICT in teaching and learning process. All the moderating factors (i.e. gender, age, year of teaching experience and teaching course) to UTAUT model adopted had significant effect on intention of adoption of the use of ICT in teaching and learning process. Notably, female lecturers, lecturers within the age range of 35 and 44 years, 21 years and above teaching experience and lecturers who were teaching ICT related courses such as Information Sciences, Engineering, Computer Science and Informatics had high efficacy for use of ICT in teaching and learning process.

4. Recommendations

Based on the findings of this study, the following suggestions are recommended:

- Lecturers should undertake mandatory training and retraining on the use of ICT in teaching and learning process.
- Government should develop ICT policies and guidelines that would support lecturers and students in the teaching and learning process.
- The university management should provide an alternative for the power supply in case of power outbreak.
- Government should allocate sufficient funds to support the procurement, installation and maintenance of ICT based system in the university.
- The university management should organize seminars and workshops to create awareness among the lecturers about the latest development on the technologies aiding the effective teaching.
- The university management should provide adequate administrative and technical support for the lecturers on the use of ICT.

5. References

- i. Achimugu, Oluwagbemi, Oluwaranti, & Afolabi. (2009). Adoption of Information and Communication Technologies in Developing Countries: An Impact Analysis. *Journal of Information Impact (JITI)*, 9(1), 37-46. Retrieved on March 12, 2017 from: <http://www.jiti.com/v09/jiti.v9n1.037-046.pdf>.
- ii. Azlina, A., Razak, F. & Abdulla, W. (2013). Assessing the effects of UTAUT and Self Determination Predictor on Students Continuance Intention to Use Student Portal, *World Applied Sciences Journal* 21(10), 1484-1489. Retrieved on March 16, 2017 from: <http://citeseerx.ist.psu.edu/viewdoc/download;jsessionid=877C09E70D3543287AD889A563B51B1B?doi=10.1.1.388.835&rep=rep1&type=pdf>.
- iii. Bridget, S. (2008). Factors Affecting Teachers' Pedagogical Adoption of ICT. *Springer Science*, 449- 460. Retrieved on March 20, 2017 from: http://link.springer.com/chapter/10.1007%2F978-0-387-73315-9_27#page-1.
- iv. Chaputula, A. H. (2012). State, adoption and use of ICTs by students and academic staff at Mzuzu University, Malawi. *Program*, 46(4), 364-382.
- v. Chiemeké, & Longe. (2007). Information communication Technology in Nigeria: Prospects, Challenges and Metrics. *Asian Journal of Information Technology*, 6(3), 280-287. Retrieved on March 12, 2017 from: <http://docsdrive.com/pdfs/medwelljournals/ajit/2007/280-287.pdf>.
- vi. Chumo, K.P. & Kessio, D.K. (2015). Use of UTAUT Model to Assess ICT Adoption in Kenyan
- vii. Public Universities. *Journal of Information and Knowledge Management*, 5(12), 79-83.
- viii. Retrieved on March 20, 2017 from: <http://www.iiste.org/Journals/index.php/IKM/article/view/27815/27815-30551-PB.pdf>.
- ix. Davis, F.D., Venkatesh, V. (2000). A theoretical extension of the technology acceptance model: four longitudinal field studies. *Management Science*, 46 (2), 186–204.
- x. DeLacey, B., & Leonard, D. (2002). Case study on technology and distance in education at the Harvard Business School. *Education Technology and Society*, 5. Retrieved on March 21, 2017 from: http://www.ifets.info/journals/5_2/delacey.html.
- xi. Dickson, O.I. (2012). The Role of ICT Development in Open and Distance Education: Achievements, Prospects and Challenges. *African Journal of Teacher Education*, 2(2), 23-30. Retrieved on
- xii. March 15, 2017 from:
- xiii. <https://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwikir eFjtLSAhWDkywKHQyNDqEQFggYMAA&url=https%3A%2F%2Fjournal.lib.uoguelph.ca%2Findex.php%2Fajote%2Farticle%2Fdownload%2F1827%2F2587&usq=AFQjCNFXaiFKqVvr286rp9iHscUKT17Ndw&bvm=bv.149397726,d.bGg/1827-11564-1-PB.pdf>.
- xiv. Dotimi, D.A. & Hamilton-Ekeke, J.T. (2013). Information and Communication Technology (ICT) – E-Learning in Nigerian Tertiary Institutions, *The Librarian and Information Manager*, 6(1), 44-59.
- xv. Etim, E.E., Akpan, I.U. & Ibok, E. (2013). Globalization and the Educational System in Nigeria. *International Journal of Modern Management Sciences*, 2(1), 7-17. Retrieved on March 21, 2017 from: <http://modernscientificpress.com/Journals/ViewArticle.aspx?FOpILrGYiCrMSJC618aW4wwXI96zvsctIYJ79AAXzx xm111vQ38VNoJAtqnBE2r3>.
- xvi. Hamilton-Ekeke, J.T. & Mbachu, C.E. (2015). The Place of Information, Communication and Technology (ICT) in Teaching and Learning in Nigerian Tertiary Institutions. *American Journal of Educational Research*, 3(3), 340-347. Retrieved on March 12, 2017 from: <http://pubs.sciepub.com/education/3/3/13/education-3-3-13.pdf>.
- xvii. Legris, P., Ingham, J. & Colletette, P. (2003). Why do people use information technology? A critical review of the technology acceptance model, *Information & Management*, 40(3), 191-204. Retrieved on March 21, 2017 from: <https://pdfs.semanticscholar.org/6d1b/2672761bb697c55f775a07ca1cf30f56a1c7.pdf>.
- xviii. Nassuora, A. B. (2013). Student Acceptance of Mobile Learning for Higher Education in Saudi Arabia. *International Journal of Learning Management System*, 1(1), 1-9. Retrieved on March 21, 2017 from: <http://www.naturalspublishing.com/files/published/57755yw5wvd3xw.pdf>.
- xix. Nchunge, D.B., Sakwa, M. & Mwanga, W. (2013). Assessment of ICT Infrastructure on ICT Adoption in Educational Institutions: A Descriptive Survey of Secondary Schools in Kiambu County Kenya. *Journal of Computer Science &*

- Information Technology*, 1(1), 32-45. Retrieved on March 12, 2017 from: http://jcsitnet.com/journals/jcsit/Vol_1_No_1_June_2013/2.pdf.
- xx. Oduma, J. (2013). Teacher Education and Information Communication Technology, in Nwaham, C.O, Moemeke, C.D. & Onyeagwu, F.O (Eds) *In Search of Excellence in Teacher Education in The 21st Century*, Agor: Cee Emmy lyke Venture.
- xxi. Oye, N.D., Aiahad, N. & Ab.rahim, N.(2011) *Awareness, Adoption and Acceptance of ICT Innovation in Higher Education Institutions. International Journal of Engineering Research and Applications (IJERA)*, 1(4).1393-1409. Retrieved on March 12, 2017 from: <http://www.ijera.com/papers/Vol%201%20issue%204/T01413931409.pdf>.
- xxii. Sachin, P., Patil Vidyapeeth, P. & Razdan, P.N. (2015). Creating Awareness, Acceptance and Application of E-Learning in Higher Education Institutions: Using Technology Acceptance Model (TAM). *International Journal of Multidisciplinary Consortium*, 2(4), 1-8. Retrieved on March 12, 2017 from: <http://ijmc.rtmonline.in/vol2iss4/0430115.pdf>.
- xxiii. Said, A., Lin, L. & Jim, P. (2009). Barriers to Adopting Technology for Teaching and Learning in Oman. *Computers & Education*, 53(3), 575-590. Retrieved on March 21, 2017 from: [https://eric.ed.gov/?download.Samuel,N.A.&Hillar,A.\(2014\).ReviewofObstacleswhichinhibitICTAdoptioninHigherEducation.EuropeanScientificJournal,10\(13\),462-470.RetrievedonMarch21,2017from:http://eujournal.org/index.php/esj/article/viewFile/3370/3134](https://eric.ed.gov/?download.Samuel,N.A.&Hillar,A.(2014).ReviewofObstacleswhichinhibitICTAdoptioninHigherEducation.EuropeanScientificJournal,10(13),462-470.RetrievedonMarch21,2017from:http://eujournal.org/index.php/esj/article/viewFile/3370/3134).
- xxiv. Sara, H., Brown, O., David, H., Enos, K., Susan, N., Azra, N. & Leonard, W. (2010). Developing the Use of Information and Communication Technology to Enhance Teaching and Learning in East African Schools: Review of the Literature. Centre for Commonwealth Education & Aga Khan University Institute for Educational Development – Eastern Africa Research Report No. 1. Retrieved on March 12, 2017 from: http://www.educ.cam.ac.uk/centres/archive/cce/publications/CCE_Report1_LitRevJune0210.pdf.
- xxv. Schepers, J. & Wetzels, M.(2007). A Meta-Analysis of the Technology Acceptance Model: Investigating Subjective Norm and Moderation Effects. *Information & Management*, 44, 90–103. Retrieved on March 15, 2017 from: <https://ai2-s2-pdfs.s3.amazonaws.com/9ca7/a563741e76c1a3b5e749c78a0604cf18fa24.pdf>.
- xxvi. Sife, A. S., Lwoga, C., & Sanga, C. (2007). New technologies for teaching and learning: Challenges for higher learning institutions in developing countries. *International Journal of Education and Development Using Information and Communication Technology*, 3(2), 57-67. Retrieved on March 12, 2017 from: https://www.google.com.ng/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&cad=rja&uact=8&ved=0ahUKEwi7jPethtLSAhUBECwKHaKNDncQFggYMAA&url=http%3A%2F%2Fwww.learntechlib.org%2Fd%2F42360&usg=AFQjCNE-0_of2ZWqnqgAre-ta2u7Y6KAtg&bvm=bv.149397726,d.bGg/Article_42360.pdf.
- xxvii. Shumba, L. & Chaamwe, N. (2016). An Investigation into the State and use of ICTs by Academic Staff of the Copperbelt. *Palgo Journal of Education Research*, 4(3), 181-188. Retrieved on March 21, 2017 from: <http://www.palgojournals.org/PJER/Index.htm>.
- xxviii. Venkatesh, V., Morris, M.G., Davis, G.D., & Davis, F.D. (2003). User acceptance of information technology: toward a unified view. *MIS Quarterly*, 27(3), 425-478. Retrieved on March 16, 2017 from: <https://nwresearch.wikispaces.com/file/view/Venkatesh+User+Acceptance+of+Information+Technology+2003.pdf>.
- xxix. Yeboah, K. O., Kwame, O. K. & Kyere-Djan, R. (2013). Factors Affecting ICT Adoption in Tertiary Institutions in Ghana: A Case of Kwame Nkrumah University of Science and Technology. *Information and Knowledge Management*, 3(6), 13-21. Retrieved on March 21, 2017 from: [http://pakacademicsearch.com/pdf-files/eng/510/13-21%20Vol%203,%20No%206%20\(2013\).pdf](http://pakacademicsearch.com/pdf-files/eng/510/13-21%20Vol%203,%20No%206%20(2013).pdf).