Behavioral Intention to Accept and Use ICT in Public University: Integrating Quantitative and Qualitative Data

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ABSTRACT

Information and communication technology (ICT) acceptance in tertiary institutions has been the focus of recent Information systems researches. Acceptance has its models, the most current and notable being UTAUT. This model has been successfully applied to verify levels of ICT acceptability in recent researches. This paper considers integrating quantitative and qualitative data of the research using sequential mixed methods. The study shows that, quantitative phase presents the constructs that have significant influence on behavioral intention of the academic staff to accept and use ICT. However the qualitative phase interprets the in-depth meaning of the statistical results and the environmental challenges that must be tackled to realize the actual behavioral intention of the academic staff. Integrating qualitative and quantitative data of the research has given the true impression of the behavioral intention of the academic staff to accept and use ICT in public university.

Keywords: Acceptance; Behavioral intention; Integrating; ICT; Qualitative; Quantitative

1.  INTRODUCTION

The failure to use technology by many academics in the teaching and learning process is of particular concern. The implication for leaders in the delivery of IT service in a university environment is that to meet the reform agenda, not only must they provide administration efficiencies, but also create an environment that appropriately supports technological innovation in the university’s teaching and learning. Most of the studies on innovation in higher education have centered on ICT software and hardware designs that are driven from information science (IS) or information technology (IT) perspective of behavioral designs that are driven from information science (IS) or information technology (IT) perspective of behavioral intention to use the system on an individual Level (Fishbein & Ajzen, 1975; Venkatesh & Davis, 2000). The obvious problem Surry and Ensminger, encountered when discussing about technology is that there are so many different investigations and topics on the subject. Therefore, there is at various levels within any educational system, different expectation and drivers about technology’s value and adoption on both personal and organizational level (Surry & Ensminger, 2006). (Gubahar, 2008) in his study found that pre-service teachers are willing to use technology but the problem is that no lessons to facilitate them with skills that will transform them into technology competent teachers.

Globalization is the networking of the world through the global network, to develop global economy. Hence people around the globe are more connected to each other than ever. Undoubtedly, the use of ICT is inevitable and ICT skills are very necessary to participate in the knowledge societies and economies. Certainly, ICT is replacing traditional information and communication gradually. According to the (Carol, 2007) much of our curricula and education systems are still products from a mechanistic past, in which predetermined knowledge was delivered in a linear format to a mass audience. The focus was on transferring information in a controlled sequence without accounting for the contextual settings of the different learners.

Adopting the use of ICT and IS within higher education seems inevitable as digital communication and information models become the preferred means of storing, accessing and disseminating information. The question of why university academicians decide to accept or reject a particular technology continues to be an important issue. Using ICT facilities in teaching and learning has brought transformation to the way teachers teach and the way the students learn (Ajayi, 2008). ICT infrastructure is lacking in most of the Nigerian universities, therefore the students have no option than to go to the cyber cafes around the campus (Olaniyi, 2006). Due to the usefulness, of ICT, it has been discovered that the knowledge of ICT usage improves human capacity in every field of human endeavor. Based on this, workshops, seminars, and conferences are conducted to improve the level of awareness of stakeholders (Gesci, 2007).

ICT proficiency is the ability to use digital technology, communication tools, and networks appropriately to solve information problems in order to function in an information society. This includes the ability to use technology as a tool to research, organize, evaluate, and communicate information. ICTs have the potential for increasing access to and improving the relevance and quality of education. The benefits of ICT tools for education are that, through ICT, images can be used in teaching and improving the retentive memory of students. Through ICT, teachers can easily explain complex instructions and ensure students’ comprehension. And through ICT, teachers are able to create interactive classes and make the lessons more...
enjoyable. Although ICT in education also have some disadvantages such as complications in setting up the device, too expensive to afford and hard for an inexperience teachers to use, this cannot be compared to the great advantages it has for teaching and learning.

(Sife, Lwoga, & Sanga, 2007) argued that ICTs have not permeated a great extend in many higher learning institutions, not only in Tanzania but in many developing countries, due to many socioeconomic and technological circumstances. In their article, they observe that despite the achievements that the institutions of higher learning education in Tanzania have accomplished they still face many challenges in undertaking the ICT adoption process. The challenges include lack of a system approach to learning, awareness and attitudes towards ICTs, administrative and technical support, staff development, and lack of ownership, and inadequate funds.

Public expectations for ICT and educational systems have increase with the ubiquity of digital technologies in daily life. Currently, the discourse has been predominantly instrumental, focusing on skills and the use of ICT in the service of curriculum and instruction. Despite the fact that computers have been widely available in educational setting for more than two decades, hitherto, teachers are neither confident nor competent users of ICT. The impact of ICT in HEIs cannot be over emphasized. Researchers in their investigations have shown that the use of mobile phones for learning can be incorporated into university structures of learning. Other studies shows that the use of ICT have positive impact in tertiary institutions (Oliver & Goerke, 2007), (Kennedy, Krause, Churchward, Judd, & Gray, 2006), (Oye, A.Iahad, & A.b.Rahim, 2012a, 2012b; Oye, A.Iahad, & Ab.Rahim, 2012a, 2012b; Oye, A.Iahad, & Ab.Rahim, 2012; Oye, A.Iahad, & NorZairah, 2011).

2. TECHNOLOGY ACCEPTANCE THEORIES AND MODELS

According to (Louho, Kallioja, & Oittinen, 2006)P.15), “technology acceptance is about how people accept and adopt some technology to use.”. The primary target of many technology acceptance studies is to examine how to encourage usage and also analyze what interrupts acceptance and usage of technologies (Krippanont, 2007). This is related to our study with the objective to find the most influential UTAUT construct affecting the behavioral intentions of academicians to accept and use ICT in Nigerian public Universities. Therefore it is important to study the existing technology acceptance models/theories. This will enable the researcher to gather theoretical concept for the study. A number of acceptance and use of technologies have been reported (Al-Qeisi, 2009; Barati & Mohammadi, 2009; Clarke, 1999; Gengatharen & Standing, 2004; Gobakhloo et al., 2010; Jayasingh & Eze, 2010; Krippanont, 2007; Legris, Ingham, & Collerette, 2003; Minishi-Majanja & Kiplang’ati, 2005; Perez, Sanchez, Carnicer, & Jimenez, 2004; Stacy & Sally, 1999; Szajna, 1996; Van Biljon & Renaud, 2009; Venkatesh et al., 2003). The scope of a theory/model in predicting and explaining behavior is measured by the amount to which the predictors in the theory could account for a reasonable proportion of the variance in behavioral intention and usage behavior.

2.1 Unified Theory of Acceptance and Use of Technology (Utaut)

Technology is of little value, unless it is accepted and used. The understanding of technology acceptance and usage is vital and cannot be over emphasized. Unified Theory of Acceptance and Use of Technology (UTAUT), is an important model for studying IT acceptance and usage. The UUTAUT model was produced by Venkatesh and his team basing it upon the conceptual and empirical similarities among eight competing technology acceptance models: TRA, TAM, MM, TPB, C-TAM-TPB, MPCU, IDT, and SCT (Birth & Irvine, 2009; Schaper & P., 2007; Van Biljon & Renaud, 2009; Venkatesh et al., 2003). The UUTAUT model effectively merge key elements from among the initial set of 32 main effects and four moderators from eight different models (Krippanont, 2007; Venkatesh et al., 2003). According to Venkatesh and his team, the theoretical perspective of UUTAUT model provides a refined view of how the determinants of intention and behavior evolve over time. Therefore the model postulates three indirect determinant of new technology usage (Performance expectancy, Effort expectancy, and Social influence), and two direct determinants of usage behavior (Intention and Facilitating conditions). The model shows that four moderator, gender, age, voluntariness, and experience were identified to play specific moderating roles to the indirect and direct determinants of technology use behavior.

![Fig 1: The UTAUT Model (Venkatesh et al, 2003: 447)](image-url)
3. METHODOLOGY

The Adamawa State University (ADSU), Nigeria was chosen as a case study. For the quantitative phase of the study, a survey questionnaire was administered, and video interviews with four Senior lecturers produced the qualitative data for the study.

3.1 Research Objectives

(i) To examine the factors associated with ICT acceptance and usage in Nigerian universities.

(ii) To measure the most influential factors for acceptance and use of ICT by the Nigerian university academicians.

(iii) To integrate the quantitative and qualitative data.

3.2 Reliability Analysis

Cronbach’s Alpha was calculated to determine the reliability of the items. Generally, reliability numbers greater than 0.6 are considered acceptable in technology acceptance reliability. Hence the results show that the questionnaire is a reliable measurement instrument and can be used for the research.

<table>
<thead>
<tr>
<th>University</th>
<th>Cronbach’s Alpha</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>.704</td>
<td>49</td>
</tr>
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</table>

From table 5.1, the constructs have good degree of reliability. Hence the results show that the questionnaire is a reliable measurement instrument and can be used for the research.

4. CASE STUDY: ADAMAWA STATE UNIVERSITY (ADSU)

100 questionnaires were administered and collected. Using regression analysis, the study want to verify the influence of the four constructs of UTAUT (PE, EE, SI, and FC) and three TAM constructs: anxiety, self-efficacy, and attitudes towards use of technology on the behavioral intention of the university academicians, towards the acceptance and use of ICT for teaching and learning. These findings will be used to accept or reject the five null hypotheses stated:

H01: The academic staff of ADSU rejects acceptance and usage of ICT in their workplace.

H02: UTAUT do not predict successful acceptance and use of ICT by the ADSU academic staff.

H03: Computer self-efficacy does have impacts on ADSU academic staff to accept and use ICT.

From model 1, the independent variables PE1-10 contributed only (.181) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.425 and .181) respectively. The regression equation Y = 2.697 – 0.045PE1 + 0.060PE2 + PE1-10...

Table 2: Regression Analysis Summary Outcome: ADSU

<table>
<thead>
<tr>
<th>Model</th>
<th>Independent Variables</th>
<th>Dependent Variables</th>
<th>R</th>
<th>R²</th>
<th>Significant</th>
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<tr>
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<td>.425</td>
<td>.181</td>
<td>.047</td>
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<tr>
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<tr>
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<td>.533</td>
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<tr>
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<td>.118</td>
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<td>.139</td>
<td>.178</td>
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<tr>
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<td>.120</td>
<td>.153</td>
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<tr>
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<td>.054</td>
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<td>.184</td>
<td>.002</td>
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<td>31</td>
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<td>BI(1)</td>
<td>.328</td>
<td>.107</td>
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<tr>
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<td>.041</td>
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<tr>
<td>33</td>
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<td>.101</td>
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<td>35</td>
<td>AX 1-4</td>
<td>BI(5)</td>
<td>.302</td>
<td>.091</td>
<td>.057</td>
</tr>
</tbody>
</table>

"p<0.05"

4.1 Influence of PE on BI (table 2)

Discussion 1

From model 1, the independent variables PE1-10 contributed only (.181) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.425 and .181) respectively. The regression equation Y = 2.697 – 0.045PE1 + 0.060PE2 + ...
0.116PE₁ + 0.070PE₄ + 0.151PE₆ - 0.184PE₆ + 0.098PE₇ + 0.032PE₈ - 0.070PE₉ + 0.066PE₁₀ is significant with P-value .047. The coefficient shows that PE₆ is significant with p-value (.031). Here we conclude that PE₆ has positive influence on behavioral intention to accept and use ICT.

From model 2, PE 1-10, contributed only (.125) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.352 and .125) respectively. The regression equation is not significant with p-value (.262). The coefficient shows that none of the independent variables are significant on individual basis. Therefore we conclude that, they have no positive influence on behavioral intention to accept and use ICT.

From model 4, PE 1-10 contributed (.118) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.343 and .118) respectively. The regression equation is not significant with p-value (.533). The coefficient shows that none of the independent variables are significant on individual basis. Therefore we conclude that PE 1-10 have no positive influence on the behavioral intention to accept and use ICT.

From model 5, PE 1-10 contributed (.139) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.373 and .139) respectively. The regression equation is not significant with p-value (.178). The coefficient shows that none of the independent variables are significant. We therefore conclude that PE1-10 have no positive influence on the behavioral intention to accept and use ICT.

From model 6, EE 1-8 contributed (.120) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.346 and .120) respectively. The regression equation Y= 3.480 - 0.079EE₁ + 0.027EE₂ - 0.015EE₃ + 0.293EE₄ - 0.020EE₅ - 0.038EE₆ - 0.047EE₇ + 0.061EE₈, is not significant with p-value (.153). The coefficient shows that only EE4 is significant with p-value (.007), and it has positive influence on behavioral intention to accept and use ICT.

From model 7, EE 1-8 contributed .106 of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation is (.326) and R² is (.106). The regression equation is not significant with p-value (.229). The coefficient shows that EE1 is significant with p-value (.048), and it has positive influence on the behavioral intention to accept and use ICT.

From model 8, EE1-8 contributed (.150) of the total variation observed on the behavioral intention of the academic staff to accept and use ICT. The correlation and R² are (.388 and .150) respectively. The regression equation is significant with p-value (.054). The coefficient shows that EE1 is significant with p-value (.004), and it has positive influence on behavioral intention to accept and use ICT.

From model 9, EE 1-8 contributed (.211) of the total variation observed on the behavioral intention of the academic staff to accept and use ICT by the academicians. The correlation and R² are (.460 and .211) respectively. The regression equation is significant with p-value (.004) and the coefficient shows that only EE5 is significant with p-values (.040). Therefore it has positive influence on behavioral intention to accept and use ICT.

From model 10, EE 1-8 contributed (.270) of the total variation observed on the behavioral intention of the academic staff to accept and use ICT. The correlation and the R² are (.519 and .270) respectively. The regression equation is significant with p-value (.000). The coefficient shows that EE1 and EE4 are both significant with p-values (.027 and .047). Therefore we conclude that they have positive influence on the behavioral intention of the academicians to accept and use ICT.

4.3 Influence of ATUT on BI

Discussion 3

From model 11, ATUT 1-6 contributed (.086) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and the R² are (.293 and .086) respectively. The regression equation Y= 2.361 + 0.044ATUT₁ + 0.098ATUT₂ - 0.057ATUT₃ + 0.175ATUT₄ - 0.017ATUT₅ + 0.245ATUT₆, is not significant with p-value (.201). The coefficient shows that only ATUT6 is significant with p-value (.022), and it has positive influence on the behavioral intention to accept and use ICT.

From model 12, ATUT 1-6 contributed (.106) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and the R² are (.326 and .106) respectively. The regression
that both SI2 and SI5 are significant with p-values (.002 and .016) respectively. Therefore they have positive influence on the behavioral intention to accept and use ICT. From model 20, SI 1-6 contributed (.228) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and the R² are (.478 and .228) respectively. The regression equation is significant with p-value (.000) and also the coefficient shows that SI1 is significant with p-value (.014). Therefore it has positive influence on the behavioral intention to accept and use ICT.

4.5 Influence of FC on BI

Discussion 5

From model 21, FC 1-5 contributed (.078) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the R² are (.280 and .078) respectively. The regression equation Y = 4.308 – 0.147FC1 + 0.120FC2 - 0.104FC3 + 0.022FC4 + 0.035FC5, is not significant with p-value (.168). The coefficient shows that all the independent variables FC 1-5 are not significant. Therefore they have no positive influence on the behavioral intention to accept and use ICT.

From model 22, FC 1-5 contributed (.067) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the R² are (.259 and .067) respectively. The regression equation is not significant with p-value (.251), but the coefficient shows that FC4 is significant with p-value (.020). Hence it has positive influence on the behavioral intention to accept and use ICT.

From model 23, FC 1-5 contributed (.048) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and R² are (.220 and .048) respectively. The regression equation is not significant with p-value (.448). The coefficient shows that all the independent variables FC 1-5 are not significant,
and they have no positive influence on behavioral intention to accept and use ICT.

From model 24, FC 1-5 contributed (.099) of the total variation observed on behavioral intention of the academic staff to accept and use ICT. The correlation and the $R^2$ are (.314 and .099) respectively. The regression equation is not significant with p-value (.078), but the coefficient shows that FC1 is significant with p-value (.027), and it has positive influence on the behavioral intention to accept and use ICT.

From model 25, that FC 1-5 contributed (.163) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.403 and .163) respectively. The regression equation is significant with p-value (.005) and the coefficient shows that FC2 is also significant with p-value (.002). Therefore it has positive influence on the behavioral intention to accept and use ICT.

From model 26, SE 1-5 contributed (.090) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.299 and .090) respectively. The regression equation $Y= 2.352 + 0.074SE_1 – 0.074SE_2 + 0.130SE_3 + 0.151SE_4 + 0.176SE_5$ is not significant with p-value (.115) and the coefficient shows that none of the independent variables SE1-5 is significant. Therefore they have no positive influence on the behavioral intention to accept and use ICT.

From model 27, SE 1-5, contributed (.082) of the total variation observed on the behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.286 and .082) respectively. The regression equation is not significant with p-value (.151). The coefficient shows that all the independent variables SE 1-5 are also not significant. Therefore they have no positive influence on the behavioral intention to accept and use ICT.

From model 28, SE 1-5 contributed (.031) of the total variation observed on the behavioral intention of the academic staff to accept and use ICT. The correlation and the $R^2$ are (.175 and .031) respectively. The regression equation is not significant with p-value (.708). The coefficient shows that all the independent variables SE 1-5 are also not significant. Therefore they have no positive influence on the behavioral intention to accept and use ICT.

From model 29, SE 1-5 contributed (.208) of the total variation observed on the behavioral intention of the academic staff to accept and use ICT. The correlation and $R^2$ are (.456 and .208) respectively. The regression equation is significant with p-value (.001) and the coefficient shows that SE4 is also significant with p-value (.008). Therefore it has positive influence on the behavioral intention to accept and use ICT.

From model 30, SE 1-5 contributed (.184) of the total variation observed on the behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.429 and .184) respectively. The regression equation is significant with p-value (.002) and the coefficient shows that SE4 is significant with p-value (.001). Therefore it has positive influence on the behavioral intention to accept and use ICT.

4.7 Influence of AX on BI

Discussion 7

From model 31, AX 1-4 contributed (.107) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.328 and .107) respectively. The regression equation $Y = 5.000 – 0.074AX_1 – 0.134AX_2 -0.173AX_3 + 0.060AX_4$, is significant with p-value (.028), and the coefficient shows that AX3 is also significant with p-value (.031). Hence it has positive influence on the behavioral intention to accept and use ICT.

From model 32, AX 1-4 contributed (.041) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.203 and .041) respectively. The regression equation is not significant with p-value (.402). In addition the coefficient shows that none of the independent variables AX 1-4 are significant. Therefore they have no positive influence on behavioral intention to accept and use ICT.

From model 33, that AX 1-4 contributed (.107) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation is (.328) and $R^2$ is (.107). The regression equation is significant with p-value (.028). The coefficient shows that only AX3 is significant with p-value (.002), and it has positive influence on the behavioral intention to accept and use ICT.

From model 34, AX 1-4 contributed (.078) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the $R^2$ are (.279 and .078) respectively. The regression equation is not significant with p-value (.101); however the coefficient shows that AX1 is significant with p-value (.033). Therefore it has positive influence on the behavioral intention to accept and use ICT.

From model 35, AX 1-4 contributed (.091) of the total variation observed on behavioral intention of the academicians to accept and use ICT. The correlation and the
R² are (.302 and .091) respectively. The regression equation is not significant with p-value (.057) and the coefficient shows that none of the independent variables AX1-4 is significant. Therefore they have no positive influence on the behavioral intention to accept and use ICT.

5. DISCUSSION ON THE HYPOTHESES

H₀₁: The academic staff of ADSU rejects acceptance and usage of ICT in their workplace

Performance expectancy is the extent an individual believes the system will help them do their jobs better (PU). Model 1, shows that (PE1-10) is significance with p-value (.047). Hence it has positive influence on the behavioral intention of the academicians to accept and use ICT in their workplace. Effort expectancy is related to how easy an individual believes the system is to use (PEOU). Model 10, shows that effort expectancy has positive influence on the behavioral intention of the academicians to accept and use ICT in their workplace and is highly significant with p-values (.000). We therefore conclude that the academic staff of ADSU believes that ICT is useful and easy to use. This influences their behavioral intention to accept and use ICT in their workplace. Therefore we reject the null hypothesis (H₀₁) and accept the alternative (H₁) which states that ADSU academic staff do not reject ICT acceptance and usage in their workplace.

H₀₂: UTAUT do not predict the successful acceptance and use of ICT by the ADSU academic staff.

The UTAUT aims to explain user intention to use IS and subsequently usage behavior. The theory holds that four key constructs (PE, EE, SI & FC) are direct determinants of usage intention and behavior (Venkatesh et al., 2003). From model 1, performance expectancy (PE1-10) is significant with p-value (.047); from model 10, effort expectancy is highly significant with p-value (.000); from model 20, social influence is significant with p-value (.000) and from model 25, facilitating condition is significant with p-value (.005). These shows that each of the four constructs of UTAUT have positive influence on the behavioral intention of the ADSU academicians to accept and use ICT. Since the four constructs have significant relationship with the behavioral intention to accept and use ICT, we therefore reject the null hypothesis (H₀₂) and accept the alternative (H₂), which states that, UTAUT do predict successful acceptance and use of ICT by the academicians in ADSU.

H₀₃: Computer self efficacy does have impacts on ADSU academic staff to accept and use ICT.

Self efficacy is related to an individuals’ confidence in his/her ability to perform the behavior required to produce specific outcome. Model 29, shows that computer self efficacy have positive influence on the behavioral intention to accept and use ICT, which states that ‘I would use ICT in my class frequently’. This is significant with p-value (.001). Therefore we accept the null hypothesis (H₀₃).

H₀₄: ADSU academicians’ attitudes towards ICT influence their acceptance and use of the technology.

Model 14, shows that independent variables ATUT1-6 has positive influence on the behavioral intention of ADSU academicians to accept and use the technology. This is significant with p-value (.001). This shows that attitudes towards the use of ICT by the academic staff have positive influence on their behavioral intention to accept and use the technology. Therefore we accept the null hypothesis (H₀₄).

H₀₅: Anxiety about computer use does have an impact on ADSU academic staff acceptance and use of ICT.

Anxiety is related to fear of computer (ICT) when using one. Model 33, shows that the independent variables (AX1-4) has positive influence on the behavioral intention of ADSU academicians to accept and use ICT. This is significant with p-value (.028). Therefore we accept the null hypothesis (H₀₅). This shows that some ADSU academicians are still having fear of using ICT for teaching and learning.

6. SUMMARY

We have verified the influence of the four UTAUT constructs and the three TAM constructs on the behavioral intention of the university academicians towards the acceptance and use of ICT for teaching and learning. The UTAUT model theory was verified using regression analysis to understand the behavioral intention of the university academic staff towards acceptance and use of ICT in their workplace. The UTAUT constructs significantly correlated with behavioral intention to accept and use ICT. These are the factors associated with ICT acceptance and usage in ADSU. According to our results Perceived Usefulness (PU) has R² = .181 and significant with p-value (.047), (model 1), and Perceived ease of use (PEOU), has R² = .270, significant with p-value (.000), (model 10). This has answered objective 1, which is to examine the factors associated with ICT acceptance and usage in ADSU.

The study confirms that the most influential UTAUT constructs influencing the behavioral intention of the academic staff to accept and use ICT is Effort expectancy (EE) in ADSU (model 10), with R²=.519 and R² = .270, and significant with p-value (.000). This has answered objective 2, which is to measure the most influential factors for acceptance and use of ICT by Nigerian university academicians. Again it shows that the most influential constructs outside UTAUT model influencing the
behavioral intention of the academicians to accept and use ICT is attitudes towards use of technology (ATUT) in ADSU (model 14), with $R = .458$ and $R^2 = .210$, and significant with p-value (.001), which also answered objective 2. UTAUT model predict successful acceptance and use of ICT in ADSU. The study also certifies that some of the academicians in University A are still having the fear of using ICT for their teaching and learning. Therefore anxiety about ICT does have an impact on the academicians of ADSU.

7. MIXED METHOD RESULT

Mixed methods allow the richness of qualitative themes to be used along with quantitative data. Integrating mixed method approach enables the integration of the qualitative data at the level of statistical analysis. Triangulation is a powerful technique that facilitates quantitative (validation) and qualitative (inquiry) studies. Conducting mixed methods research involves collecting, analyzing and interpreting quantitative and qualitative data in a single study (Tashakkori & Teddlie, 2003). There is no discrete list for mixed method design options, therefore researchers should plan to develop a design that give solution to their own research questions within the constraint and boundaries of the study context (Johnson & Onwuegbuzie, 2004).

Qualitative and quantitative approach can be integrated in three different forms, which are called parallel, sequential, and iterative. In parallel approaches, the quantitative and qualitative research teams work separately but compare and combine findings during analysis phase. This approach is best suited for very large projects, such as national level poverty assessments.

Sequential and iterative approaches, which are referred to as participatory econometrics, considers varying degrees of dialogue between qualitative and quantitative phases of the research cycle and are best suited to projects of modest scale and scope. According to (Rao, 1998; Rao & Ibanez, 2003), sequential approach entails three steps:

i. Focus-group discussion, in-depth interviews techniques to obtain a grounded understanding of the issues.

ii. Constructing a survey instruments that integrates understanding from the field.

iii. Deriving hypotheses and testing with survey data.

The study approach is sequential, where the survey results show the relationship between behavioral intention of university academic staff towards acceptance and use of ICT. While the in-depth interview data help to suggest or indicate a relation between the academic staff and the university environment. The sequential mixed method approach for this study is quantitative dominance (QUAN--QUAL). It answers one type of question by collecting and analyzing two types of data (Quantitative and Qualitative).

7.1 Sequential Design

Sequential designs facilitate combining qualitative and quantitative work, but do so in a segmented way. Sequential mixed methods data collection strategies involves collecting data in an iterative process whereby the data collected in one phase contribute to the data collected in the next Phase (Creswell & Plano Clark, 2007). Sequential designs in which quantitative data are collected first can use statistical methods to determine which findings to augment in the qualitative phase (see Figure 2).

8. INTEGRATING QUANTITATIVE AND QUALITATIVE RESULTS OF ADSU

Summary of Hypotheses Discussions:

- The academic staffs of ADSU do not reject ICT acceptance and usage in their workplace.
- UTAUT do predict successful acceptance and use of ICT by the academicians in ADSU.
- Computer self efficacy does have impact on ADSU academic staff to accept and use ICT.
- ADSU academicians’ attitudes towards ICT influence their acceptance and use of the technology.
- Anxiety about computer use does have an impact on ADSU academic staffs’ acceptance and use of ICT.
The UTAUT constructs significantly correlated with behavioral intention to accept and use ICT as revealed by the discussion on the hypotheses. According to our quantitative results, performance expectancy, which is related to the extent an individual believes that using the system will help him or her attain gains in job performance (Venkatesh et al., 2003), which is also referred to as perceived usefulness has correlation, \( R^2 = .425 \) and variance, \( R^2 = .181 \), significant with \( p \)-value (.047).

8.1 When asked whether they intend to use ICT in their teaching: Responses.

Interviewee (1): I intended to use ICT for my teaching and research; but the internet connectivity is very low. Although I have Laptop, I cannot use it beyond typing. I am now learning how to properly use computer to download and upload from the internet. I can now say that, I am developing attitudes towards using ICT for teaching and learning.

Interviewee (2): I intend to use ICT; however the use of ICT is minima in this university. Only very few lecturers use ICT. Majority of the lecturers use Markers and whiteboard to lecture. Although projector are available, but lecturers do not know how to put their lectures on slides for PowerPoint presentation. Only few lecturers use PowerPoint presentation during lecture time. Without the use of ICT students are finding it difficult to understand the lectures as much time is spent on drawing on the board in some courses.

Interviewee (3): Yes partially, because I am a computer scientist. Sometimes I have to fuel the generator with my money to teach the students graphic using PowerPoint presentation, which is better than theoretical lectures.

Interviewee (4): Why not, yes I intend to use ICT for teaching and learning, when the facilities are available. I will definitely need more training on how to transfer all my lecture notes on slides and how to use PowerPoint for my teaching.

8.2 When asked about the curriculum on the issue of acceptance and use of ICT.

Interviewee (1): There is no option than to review the curriculum in line with ICT facility usage.

Interviewee (2): The university curriculum is deficient in this aspect, because most of the programme is not ICT focused. Presently most of the curriculums are being reviewed, so we hope that ICT will be incorporated.

Interviewee (3): Curriculum should be reviewed to incorporate ICT.

Interviewee (4): From time to time the curriculum is being reviewed; this should embrace the use of ICT. This will enhance the curriculum for better teaching and learning. The result also shows that effort expectancy which is related to how ease an individual believes the system is to use (Venkatesh et al., 2003), which is also referred to as perceived ease of use (PEOU), has correlation, \( R = .519 \), and variance, \( R^2 = .270 \), significant with \( p \)-value (.000).

8.3 When asked within your academic program so far how thorough is the acceptance and use of ICT and what would you recommend to the university.

Interviewee (1): ICT deployment for teaching and research is accepted in this university. This university is adopting ICT as the best way for teaching and learning in principle. However most of the academic staff are not using ICT currently because the infrastructures are not available yet.

Interviewee (2): There is a lot to be done because the university has the responsibility of providing the facilities that actually go with the use of ICT. Virtually almost all academic staff have their Laptops but again there is the problem of Power (i.e. lack of electricity supply). Hence most of the faculty buildings do not have power supply during working time. The connectivity is not there, because the internet service is not readily available. Here we have skeletal services, whereby you have to leave the comfort of your office to a center to access the internet. Academic staff suppose to seat in the comfort of their office to access the internet.

Interviewee (3): It is true that most of the lecturers have Laptop, but most of them are not using it for teaching and research. We are not yet using ICT for teaching; most of our lectures are theory. One basic problem militating against the use of ICT is lack of power supply. Again we do not have Labs/ lecture Halls that are ICT friendly. The university should provide ICT facilities and stand by Generators. Experts should come in, to train the academic staff on how to use ICT for teaching and research.

Interviewee (4): The use of ICT is a worldwide phenomena and this university cannot be an exception. In principle the academic staff are using ICT. In practice most of the academic staff has not started using ICT for their teaching and learning. The university has given some of the academic staff laptops, but there is no power supply and the internet facilities are poor. The university should set time to train the academic staff on how to use ICT for teaching and research. The university should endeavor to build Labs/Halls and equipped them with ICT facilities for Teaching and learning.
Performance expectancy (PE) that is perceived usefulness is significant with p-value (.047) and effort expectancy (EE) that is perceived ease of use is also significant with p-value (.000). They are the factors associated with ICT acceptance and usage. Therefore this has answered objective 1, which is to examine the factors associated with ICT acceptance and usage in ADSU. The study also confirms that the most influential UTAUT construct in ADSU, is effort expectancy (EE), with correlation, R= .519 and variance, R² = .270, significant with p-value (.000). This has answered objective 2, which is to measure the most influential factors for acceptance and use of ICT by Nigerian university academicians.

The study shows that the most influential constructs outside UTAUT model is attitudes toward use of technology (ATUT) in ADSU, with correlation, R= .458 and variance, R² = .210, significant with p-value (.001).

8.4 When asked about the most important thing that would enable them to accept and use ICT.

Interviewee (1): The University should bring expert to train lecturers on how to put their lecture notes on slides and how to use the slides for teaching. Again there should be Lab/ Lecture hall with ICT facilities for teaching. There should be regular power supply with standby dedicated generator. The internet connectivity should be improved. Academic staff as time allow should be sponsored to attend work-shop training on the use of ICT for teaching and research.

Interviewee (2): The only way to encourage the academic staff to accept and use ICT for teaching and research is to train them on how to use ICT for teaching. The academic staff should have the basic computer skill, use of PowerPoint presentation, and how to upload them.

Interviewee (3): The most important things to do to encourage academic staff to use ICT for their teaching and learning are: Provide them with Laptops; let there be in-house training, make ICT facilities available; let there be regular power supply; make ICT training mandatory for all academic staff. Let there be motivation in terms of soft loan for academic staff to buy their own ICT facilities. Let there be good internet services with moderate charge for academic staff.

Interviewee (4): To assist the academic staff to accept and use ICT, there should be more facilities on ICT for teaching and research. Internet services should be improved and moderate charges for the academic staff. There should be regular supply of electricity. Soft loan without interest should be given to academic staff to procure their own ICT systems to be paid in 3 or 5 years. There should be training and re-training on the use of ICT for teaching and learning.

The study also certifies that some of the academicians in ADSU are still having the fear of using ICT for teaching and learning.

8.5 When asked whether they support the idea of developing a guideline for ICT acceptance and usage for university academic staff.

Interviewee (1): It is good to have ICT guideline as a blue print to guide the training session with a time limit. The guideline should have mandatory induction programme for newly employed staff on using ICT for teaching and research. ICT literacy should be in the condition of service. This should also spell out the responsibility of the management on the issue of staff motivation, funding, security and the acquisition of ICT infrastructures with appropriate Labs/ Lecture halls.

Interviewee (2): We definitely need a guideline for ICT acceptance and usage by the academic staff. The guideline should elaborate the commitment of the management on this issue financially. All forms of training required should be stated step by step for new and old lecturer, to reduce ICT phobia. This will go a long way to help Nigerian university academicians to catch up with the developed world.

Interviewee (3): ICT guideline is a welcome idea; this will serve as a working plan for the new lecturers coming into the service and a continuous process of training for the older staff until they reach the final stage of the training. This will reduce ICT phobia among the academic staff.

Interviewee (4): The guideline is a good idea. This will serve as a blue print of transformation from an ICT illiterate to ICT literate and users. The guideline should make ICT training as part of condition of service and promotion point.

9. CONCLUSION

Using the mixed method approach, the quantitative phase shows that, the perceived usefulness (PE) is significant with p-value (.047) and the perceived ease of use (EE) is significant with p-value (.000). The results shows that the intention to accept and use ICT by the academic staff is a function of various concepts including the understanding that ICT is useful and it is not difficult to use. The findings from the qualitative interviews corroborate the survey findings. The interviewees responded that they intend to use ICT, however majority of the lecturers are still using
marker and whiteboard for lectures. Projectors are available but lecturers do not know how to put their lectures on slides for PowerPoint presentation. The interviewees confessed that they need ICT training on how to transfer their lecture notes on slides. The interview confirms that most of the academic staff are not using ICT currently because the infrastructures are not available. Contrary to the survey findings, interviewees tend to uncover the environmental challenges related to the statistical analysis. Hence the survey become more meaningful when interpreted.

The study confirms that performance expectancy (PE), significant with p-value (.047) and effort expectancy (EE), significant with p-value (.000) are found to be the most significant predictors of academic staff acceptance and use of ICT. This has answered objective 1, which is to examine the factors associated with ICT acceptance and usage in ADSU. The study also confirms that the most influential UTAUT constructs in ADSU is effort expectancy (EE), with correlation, R=.519 and variance, R^2=.270, significant with p-value (.000) which answers objective 2, which is to measure the most influential factors for acceptance and use of ICT by Nigerian university academicians.

Again the statistical result from the study shows that the most influential constructs outside UTAUT model is attitudes toward use of technology (ATUT) in University A, significant with p-value (.001). Attitudes towards using technology are related to monitoring the users’ attitudes towards computers. The qualitative phase shows that, there should be regular power supply with dedicated generators as stand by. The university should bring experts to training lecturers on how to use ICT for teaching and learning. Therefore they need training and re-training on the use of ICT for teaching and learning. Academic staffs need motivation in form of soft loan to procure their own ICT facilities. The quantitative phase of the study certifies that some of the academicians in ADSU are still having the fear of using ICT for teaching and learning. They need to learn the basics of the technologies that will be most useful in their teaching and learning. The qualitative phase shows that, ICT guideline which will serve as a blue print is necessary. It is true that people find it difficult to adapt to change but when there is a guideline, ICT phobia will be reduced to minimal with time.

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REFERENCE


[31] Stacy, W., & Sally, J. (1999). Technology diffusion within educational institutions: applying the
technology acceptance model. (Accessed 29 March 2007) [Electronic Version],


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