Empirical modeling of information communication technology usage behaviour among business education teachers in tertiary colleges of a developing country

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This study has empirically tested the fitness of a structural model in explaining the influence of two exogenous variables (perceived enjoyment and attitude towards ICTs) on two endogenous variables (behavioural intention and teachers' Information Communication Technology (ICT) usage behavior), based on the proposition of Technology Acceptance Model (Davis, 1989a). The sample was 212 teachers from Business Education faculties of 13 tertiary colleges in the northwestern region of Nigeria. As one of the major developing countries in Africa, Nigeria has invested a lot of resources in ICTs for the past several years to ensure the appropriate uptake and integration of technology across the important sectors of the country's economy, especially the education sector. Unfortunately, the country's standard of ICT adoption has remained low for many years. Congruently, its educational sector has remained incapacitated by lack of adequate ICT facilities and lack of skilled ICT-manpower, with school teachers using obsolete tools in the classroom, and some of them buying and using ICTs out of their own volition. Teachers' use of ICTs in tertiary schools' has remained poor in Nigeria, and research initiatives on ICT usage behaviour are rare and predominantly descriptive in nature. Past studies have dwelt on investigating the influence of physical infrastructural facilities on teachers' use of technology in the classroom. The current study has investigated the influence of teachers' perceptive beliefs, attitudes and intentions on their technology usage behaviour, using Structural Equation Modeling (SEM). Findings have shown that teachers' perceived enjoyment of ICTs influences their ICT usage behaviour in the classroom ($\beta = .281$, $p < .05$); teachers' perceived enjoyment of ICTs influences their intention to use ICTs ($\beta = .740$, $p < .001$); teachers' ICT attitude influences their intention to use ICTs ($\beta = .122$, $p < .05$); teachers' ICT attitude influences their ICT usage behaviour ($\beta = .512$, $p < .001$) and teachers' behavioural intention influences their ICT usage behaviour ICTs ($\beta = .-368$, $p < .05$). Teachers' behavioural intention to use ICTs has, however, predicted a decrease in their self-reported ICT usage behaviour. This study will benefit school leaders, curriculum planners and researchers in technology acceptance behaviour in Africa, by giving them guidance in taking decisions concerning teachers' perceptions and intentions of using ICTs in the classroom. The study will play a vital role in filling up the research gap that exist in technology acceptance behaviour among business education faculties across tertiary institutions in Nigeria and the rest of Africa. Future research on the subject matter may attempt to investigate the moderating roles of voluntariness and compulsory standards in influencing teachers' ICT usage behaviour.

Keywords: attitude towards technology; behavioural intention; business education; developing country; ICT usage behaviour; Nigeria; perceived enjoyment; South Africa; teachers

Introduction

Successful adoption and usage of ICTs in education is fundamental to the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century (Onyia & Offorma, 2011). Use of ICTs has become necessary in the education process, because it has the capacity of promoting quality of education (Johnson, 2007). Educational institutions (mostly those in the advanced regions of the world) are vigorously implementing highly integrated ICT schemes with competent personnel, using ICTs in virtual classrooms (López-Pérez, Pérez-López, Rodríguez-Ariza & Argente-Linares, 2013). Unfortunately, most regions of Africa are yet to embrace ICTs appropriately (Anderson, 2010). In Europe, America, Australia and most of Asia, teachers have adapted to using ICTs in the classroom (López-Pérez et al., 2013), but in Nigeria and most of the countries of Africa, teachers are still struggling with obsolete tools (Mbaba & Shema, 2012; Ubulom, Enyekit & Onuekwa, 2011; Umoru, 2012).

Although the contributions of ICTs to national growth are highly valued in Nigeria, South Africa and the rest of the developing countries of Africa (Awosejo, Ajala & Agunbiade, 2014), studies have revealed that ICTs have not permeated to a great extent in many higher learning institutions of the African region, due to extant socioeconomic and technological challenges (Sife, Lwoga & Sanga, 2007). While information about technology acceptance from developed countries and other emerging societies are well represented (Kwak, Park, Chung & Ghosh, 2012; Zhang, Gao & Ge, 2013), perspectives from Africa (Nigeria and South Africa inclusive) are scarce (Arekete, Ifinedo & De Akinnuwesi, 2014; Ojiako, Chipulu, Maguire, Akinyemi & Johnson, 2012).

Tackling ICT usage problems in emerging economies like Nigeria and South Africa requires in-depth research. But, while ICT studies across the globe are increasing daily, they are still rare in Africa (Jegede, Dibu-Ojerinde & Ilori, 2007). Unfortunately, ICT studies from countries of developed regions may not always apply to countries of developing or underdeveloped regions, owing to cultural peculiarities, population, sampling, and/or designs limitations (Rastogi & Malhotra, 2013). Nonetheless, Nigeria, South Africa and the rest

of Africa need to tackle their ICT usage issues, especially in education. Thus, undertaking indigenous research peculiar to their technological dispositions is fundamental. So far, prevalent studies have focused on teachers' and students' competencies, (Jegede et al., 2007; Onyia & Offorma, 2011), enabling environment (Oghogho & Ezomo, 2013), government policies (Akinsola, Herselman & Jacobs, 2005), and other similar descriptive constructs. For instance, Iloanusi, NO and Osuagwu (2009) have observed that the Nigerian government has placed greater emphasis on ICT administrative and financial transactions, while relegating the education sector to the background. It was also observed that Nigeria's educational system has been languishing over the past several years, owing to infrastructural deficiencies and the weak economic framework of the country (Aduwa-Ogiegbaen & Iyamu, 2005; Asogwa, 2013a; Ololube, Egbezor & Kpolovie, 2008; Oye, Noorminshah & Rahim, 2012). But there are other important issues that have negative effects on Nigeria's education sector, which are not unconnected with the behavioral disposition of teachers towards the use of technology in education. Such are the types of issues that were investigated in this study. Overall, teachers' willingness to shift their teaching methodologies from traditional approaches to new approaches have implications on the success of Nigeria's education system.

Literature Review

Lack of ICT integration in educational institutions of developing countries is a key factor in the existing gap between such countries and developed ones. The failure of technology adoption in education has become an issue of great concern in African countries that want to develop (including Nigeria and South Africa) (Arekete et al., 2014; McGrath & Akoojee, 2009; Oye et al., 2012).

In a report by International Telecommunication Union (ITU, 2013), empirical evidence has shown that in developing countries (such as Nigeria and South Africa), fewer people are able to benefit from the potentials of ICTs. International Telecommunication Union (ITU) had used an ICT Development Index (IDI), referred to as IDI Use sub-index, which was composed of three indicators: internet users per 100 inhabitants fixed (wired), broadband subscriptions per 100 inhabitants, and wireless-broadband subscriptions per 100 inhabitants, to measure the uptake of ICTs and the intensity of usage (an indispensable factor for countries that aspiring to become information economies and societies) across the world.

In line with the parameters set by ITU, for measuring ICT usage levels, Nigeria was ranked 98th, 101st, and 93rd for the years of 2010, 2011 and 2012, respectively – out of an approximated number of 155 countries. The country's IDI Use sub-indices for the three years were: 0.82, 1.05 and 1.72, respectively (out of a maximum score of 10). South Africa was ranked 87th, 89th, and 75th, for the same years, ahead of Nigeria each year. Her IDI Use sub-indices for the three years were: 1.26, 1.46 and 2.35 (out of the same maximum score of 10). Although South Africa was ahead of Nigeria in IDI Use sub-indices rankings, according to ITU (2013), both countries have fallen below the average rankings in terms of ICT usage, and, whereas the countries with the highest levels of ICT use have reached IDI values approaching 9 (out of a maximum of 10), the countries with the weakest ICT use levels (mostly from Africa) have IDI values of only one or less (ITU, 2013).

In a case study conducted by Yusuf and Balogun (2011) in a Nigerian university, findings have revealed teachers' lack of competence for the integration of ICTs in the curriculum of the Nigerian university. Although teachers' attitudes were evaluated in the study, findings did not show significant correlation between teachers' attitudes toward ICT usage and their lack of ICT competence – probably because the study was purely descriptive, rather than inferential. This implies the need for replicating such a study with an inferential approach, providing part of the rationale for the current study. In a pilot study conducted at the University of Jos in Nigeria, among 100 teachers have also shown that most teachers in Higher Education Institutions (HEIs) of Nigeria were not confident of their intentions to use ICTs in the classroom (Oye, Iahad & Rabin, 2011). Findings in the study have also revealed significant correlations between teachers' attitudes and intentions to use ICTs in the classroom. However, being a pilot study, the generalisability of the work was limited. Hence, this study was conducted among a larger sample of 212 teachers' in 13 HEIs located in seven Nigerian states. One of the prevalent descriptive studies around Southwestern Nigeria was that conducted by Ajayi (2008) among six Colleges of Education, to examine the use of ICTs for teaching in the colleges. Findings in the study have shown that ICTs were not adequately used for teaching in these colleges, due to intermittent supply of electricity, inadequate ICT facilities and lecturers' incompetence in the use of ICTs. Overall, Ajayi (2008) and the rest of the past studies discussed above, have not attempted to employ the use of SEM in conducting their studies. This is a methodological gap, and part of the aim of this study is to fill up such gap. Structural Equation Modeling (SEM) is a multivariate statistical programme that is increasingly being used among contemporary researchers in education and in social sciences. The programme provides the chance for simultaneously accessing pictorial explanations to multiplefactorial problems (Hair, Black, Babin & Anderson, 2010). It is very effective at minimising

residual errors, because it attaches error terms not only to the endogenous variables being investigated, but to the indicators as well. This study will provoke teachers in Nigeria, South Africa and the rest of Africa to rethink their positions on ICT, and to step up to face the current technological challenges and upheavals taking place in global education.

The meaning of ICTs

Whereas in the past, Information Technology (IT), was used as a term to describe the integration of computers and computer peripherals like printers, floppy disks drives, scanners and the early digital cameras; today, ICTs are used as a term to describe the technologies of the internet, along with computer networks, world wide web, email and search engines used in the production and sharing of information (Anderson, 2010). ICTs are technologies that enable us receive information and communicate or exchange such information with others.

ICT adoption in Nigerian education

In a model conceived by (Anderson, 2010), two dimensions of ICT integration in education are depicted, namely: technology integration and pedagogy integration. The technology dimension represents the systematic acquisition of all the tools of which ICT comprise, and the pedagogical dimension represents a continuum of changing teaching practices, owing to the adoption of varieties of ICT tools. In addition to this, there is a general consensus that ICT integration in education proceeds progressively in a series of broad stages known as emerging stage, applying stage, infusing stage and transforming stage (Anderson, 2010).

With reference to United Nations Educational, Scientific and Cultural Organisation (UNESCO)'s model of ICT adoption and use in education, Iloanusi, ON and Osuagwu (2011) postulated that 90% of Nigerian educational institutions are in the emerging phase of ICT adoption and use, while only 7% are in the applying phase, and only 3% are in the infusing and transforming phases. Implicit in this proposition is that Nigeria's educational sector is generally in a stage of infancy when it comes to ICT adoption and use. To support this, Asogwa (2013b), Delaviz, Andrade, Pouwelse and Epema, (2012) and Ololube et al. (2008) have posited that much of the difficulty faced in Nigerian education lies in the use of ICTs, owing to shortage of skilled manpower, poor electricity and serious neglect of the education sector.

Use of ICTs in business education across Nigeria

Business Education is concerned with the economic development of individuals and the provision of knowledge and skills to them in business and technology in a way that enables them to share what they know unto others.

Over the decades, business education has evolved into an indispensable aspect of human activity that serves productive purposes and meets with the needs of mankind in the current technology-driven world, be it socially, educationally, and otherwise (Beaumont, Austen, Atkins, Burdon, Degraer, Dentinho, Derous, Holm, Horton, Van Ierland, Marboe, Starkey, Townsend & Zarzycki, 2007; Renshaw, Trott & Friedenberg, 1988).

Although in Nigeria, business education has been purported to serve as a platform for producing skilled business teachers, office administrators and businessmen and women that can effectively compete in the world of work and in enterprise, as employees, entrepreneurs and as employers; it was observed in Ekpenyong and Nwabuisi (2003) that business education was not given priority in Nigeria at its inception stage, where instead, it was only sustained through private and individual institutions, rather than through government. Until recently, most Nigerian universities did not see the need for including business education courses and other technical and vocational teacher education courses in their academic programmes. This might probably account for the slow pace of the development of business education in the Nigerian context.

From empirical evidence, to achieve a sustainable development in business education, the application of ICTs is fundamental (British Educational Communications and Technology Agency or BECTA, 2000; Mann, Shakeshaft, Becker & Kottkamp, 1999). It was revealed in Dellit (2001) that since ICTs can be applied in preparing and delivering business models, as well as in the management of various aspects of the learning process; business educators are faced with the task of either pushing the boundaries of ICTs in education and exploiting its capacities to improve their outputs beyond their current familiar paradigms and limits; or to just remain confined to their familiar boundaries. However, as supposed by Dellit (2001), if business educators and the general mainstream of the teaching profession embrace ICTs, then newer, better business models of ICT enabled education would fill the educational atmosphere and more avenues for accelerated academic breakthroughs would be created. This implies that teachers in Nigeria, South Africa and the rest of Africa ought to ensure that they effectively use ICTs in executing their classroom functions.

Concerned with the inadequacies of ICT adoption among business education faculties in Nigeria, Isiyaku (2007) and Jonathan (2012) advocated that business education teachers must modernise their methods and delve into research efforts that focus on the use of technology in the classroom. In other words, to ensure that the com-

petences required for teachers in business education continue to reflect on the changing technological trends confronting them and their students, it is crucial for teachers to be abreast with relevant technology. Invariably, investigating teachers' behavioural dispositions towards use of ICTs in the classroom is an important strategy for ensuring the success of ICT integration policies in educational institutions within Africa (Tilbury & Ryan, 2011). In most of the learning institutions of the developed countries of the world, sophisticated computer hardware and software, as well as interactive learning tools like the 'collaborative black-boards', have become the order of the day (Larkin & Belson, 2005). This implies that the learning institutions of African countries (especially at the business education faculties) ought to abandon manual tools and the traditional 'classroom black-boards' and embrace new technologies in the classroom (Isiyaku, 2009; Ugwuogo, 2013). In our study, the fitness of a structural model in explaining the influence of perceived enjoyment, attitude towards technology, and behavioural intentions on ICT usage behaviour, will be tested by the use data from business education teachers in 13 tertiary colleges of Northwestern Nigeria. Considering the nature of this research, it is expected that the findings of the study will be applicable not only to Nigeria as a developing country, but to the rest of the countries of Africa who somehow share the same ICT culture and peculiarities.

Theoretical/Conceptual Framework

This study borrows insight from the original work of Davis (1989a) in Technology Acceptance Model as well as in the recent works of Venkatesh and Bala (2008) for Technology Acceptance Model III (TAM III), in which it was postulated that one's behavioral intention to use a system could be determined by system characteristics, such as perceived enjoyment, as well as by one's attitudes towards the system; and that one's actual use of the system could be well predicted by one's behavioral intention to use the system. Consistent with TAM, the current study assumes that teachers' ICT usage behaviour is determined by their intentions to use ICTs in the classroom, while their perceived enjoyment of using ICTs and their attitudes towards using ICTs are antecedents to their intentions to the usage of such ICTs in the classroom.

Perceived enjoyment

Empirical evidence has shown that teachers' perceived enjoyment of ICTs could influence their overall intention of using ICTs in the classroom. Perceived enjoyment was defined as the extent to which the use of a specific system is perceived to be enjoyable in its own right, aside from any performance consequences resulting from the system use (Venkatesh, 2000). Perceived enjoy-

ment was also defined as the perception of inherent enjoyment in using computers; apart from the anticipated improvement in performance they will bring (Davis, Bagozzi & Warshaw, 1992). In the context of our study, perceived enjoyment refers to the extent to which teachers perceive that using ICTs in the classroom is enjoyable. This is indicated by the teachers' opinions on whether they perceive ICTs to be enjoyable or not, and on whether they perceive the actual process of using ICTs to be enjoyable or not.

The theoretical underpinning for perceived enjoyment was based on the important role of the construct in helping individuals to adjust to new technologies illustrated in TAM III (Venkatesh & Bala, 2008). In an online survey conducted among news portals and forums, sport clubs and personal contacts in Germany by Kroenung, Jaeger and Kupetz (2015), findings have revealed a strong influence of perceived enjoyment on the usage of online shopping for people without mobility impairments. Also, in a study conducted on a sample of 1,280 resident doctors from 13 tertiary healthcare institutions in South-Western Nigerian on their utilisation of internet health information resources in tertiary healthcare institutions in the country, findings have revealed that perceived enjoyment has significant relationship with the utilisation of such resources (Ajuwon & Popoola, 2015).

Therefore, our study hypothesizes H_1: perceived enjoyment has significant direct effect on ICT usage behaviour.

Furthermore, the findings of Davis et al. (1992), have revealed the significant impact of perceived enjoyment on behavioural intention. Atkinson and Kydd (1997) and Van der Heijden (2004) have also revealed the strong impact of perceived enjoyment on behavioural intention for hedonic systems. Perceived enjoyment has also explained the intention to use Smartphone applications for users and non-users in (Verkasalo, López-Nicolás, Molina-Castillo & Bouwman, 2010).

Therefore, our second hypothesis is H_2: perceived enjoyment has significant direct effect on behavioural intention.

Attitude towards ICTs

Attitude towards ICTs was defined as a person's general evaluation or feeling towards ICTs and specific computer and internet-related activities (Smith, Caputi & Rawstorne, 2000). Attitude towards ICTs or ICT attitude refers to the way in which people think and feel towards ICTs, their demeanour, and how they react to ICTs, as well as how they react to change initiatives that have to do with ICTs (Wilkinson & Schilt, 2008).

Attitude towards ICTs can also be referred to as the extent to which a teacher exhibits favourable or unfavourable dispositions towards using ICTs in facilitating classroom instructions. Attitude towards

ICTs is one of those important factors that influence teachers' intention for using ICTs in the classroom (Rana, 2012). It relates to the extent to which ICTs are considered to be pleasant, Venkatesh, Morris, Davis, GB and Davis, FD (2003), the extent to which ICTs are considered as good idea (Venkatesh et al., 2003), the extent to which ICTs are considered appealing (Teo, 2010) and the extent to which ICTs are considered interesting (Teo, 2011). Fishbein (1979) postulated that attitude determines behavioural intention towards behavioural performance. Dishaw and Strong (1999) confirmed this assertion when they found significant positive relationships between attitude and behavioural intention in their attempt to extend the technology acceptance model with task-technology fit constructs.

TAM 1 has given attitude towards ICTs a theoretical underpinning in our study, where it theorised that attitude towards technology was a significant determinant of intention to use tech-nology. In a study conducted among 59 faculty members from Shaqra University, Saudi Arabia, to understand academics behavioural intention to-wards using learning management systems by Alharbi and Drew (2014), findings revealed that attitude positively affects behavioural intention. Also, using a mixed method approach to under-stand the acceptance and usage of ICTs in a Nigerian university, Oye et al. (2012) found atti-tude to be a strong determinant of behavioural intention towards ICT usage.

Therefore, our study hypothesises H_3: attitude towards ICTs has significant direct effect on behavioural intention.

In Rana (2012) it was posited that teachers' attitudes are among the fundamental factors influencing successful ICT adoption in the class-room. This was earlier observed in Oye et al. (2012) where attitude was found to be a strong determinant of ICT use. Congruently, in a recent study conducted in Nigeria on the antecedent factors to end-users symbolic acceptance of technology by Arekete et al. (2014) findings have shown that attitude has strong impact on usage of technology.

Based on the foregoing, our study hypo-thesises H_4: attitude towards ICTs has significant direct effect on ICT usage behaviour.

Behavioural intention towards using ICTs

The underlying assumption of TAM is that people's computer use can be predicted reasonably well from their intentions (Davis, Bagozzi & Warshaw, 1989b). This is the theoretical underpinning for investigating the role of behavioural intention in determining teachers ICT usage behaviour in this study. TAM considers behavioural intention to be the core measure for technology acceptance (Pynoo & Van Braak, 2014). As defined in Teo (2011), behavioural intention refers to the degree of a teacher's willingness to use technology. In this study, behavioural intention is defined as the degree to which teachers are determined and intending to use ICTs in the classroom. This was indicated by the opinions of teachers regarding whether they would use ICTs in subsequent school semesters or not, as well as regarding whether they would use the ICTs regularly during the coming semesters or not.

Studying teachers' behavioural intention is fundamental to understanding their commitment to the use of technology in the classroom; and the extent to which teachers are willing to use ICTs in the classroom will determine whether or not they eventually use them. As posited in Fishbein and Ajzen (2011) and in Venkatesh (2000) and Venkatesh and Bala (2008), behavioural intention is determined by one's perception of personal factors such as attitude towards the behaviour and system characteristics, such as perceived enjoyment. Hence, Venkatesh (2000) and Venkatesh and Davis (1996), have found strong, significant, positive relationships between behavioural intention and actual usage behaviour. In the same vein, Kim (2008) has found there to be a significant relationship between behavioural intention and actual usage of a smartphone.

Therefore, our study hypothesises H_5: behav-ioural intention as having a significant direct effect on ICT usage behaviour.

ICT usage behaviour

ICT usage behaviour can be defined as one's fre-quency of use of ICTs (how often one uses ICTs) and one's volume of work done with ICTs (how much work one does with ICTs) over a specified period of time (Kim, 2008). ICT usage behaviour can also be defined as the extent to which ICTs are used daily, and to refer to the frequency of their usage in proportion to the amount of task performed with the ICTs (Igbaria, Iivari & Maragahh, 1995). In our study, ICT usage behaviour is referred to as the frequency with which teachers use ICTs in the classroom in relation to the types of jobs they perform and the volume of the jobs they perform with the ICTs. Teachers' opinions on the frequency with which they use ICTs in preparing continuous assessments, and their opinions on the volume of classroom functions they perform each day using ICTs, are indicative of their ICT usage behaviour.

The theoretical underpinning for investigating teachers' ICT usage behaviour in our study was de-rived from TAM, where strong linkages and affinities were theorised between usage behaviour on one hand, and perceptions, attitudes and intentions on the other hand (Ajzen, 1985; Davis, 1989; Fishbein & Ajzen, 1975; Venkatesh & Bala, 2008; Venkatesh & Davis, 2000). Extant research has consistently shown that there are strong correlations between perceptual beliefs, attitudes,

intentions and usage behaviour (Ajzen, 1991; Fishbein & Ajzen, 2011). Although in studies conducted by Duyck, Pynoo, Devolder, Voet, Adang and Vercruysse (2008) and Pynoo and Van Braak (2014), behavioural intention was not found to reasonably predict self-reported use, findings in Venkatesh (2000) and Venkatesh and Davis (1996) have revealed strong and significant positive relationships between behavioural intention and actual usage behaviour.

Overall, the conceptual framework of this study is consistent with TAM 1 of Davis (1989a) and TAM III of Venkatesh and Bala (2008). The variables that constitute the framework of the study, namely: perceived enjoyment (PE), ICT attitudes or attitudes toward technology (ATT), intention toward technology use, or behavioural intention (BI) and technology or ICT usage behaviour (USE) are represented in Figure 1, with the proposed hypothetical paths that portray the five hypotheses of the study.
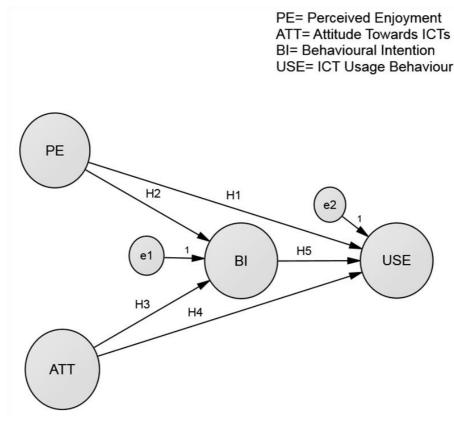

PE= Perceived Enjoyment
ATT= Attitude Towards ICTs
BI= Behavioural Intention
USE= ICT Usage Behaviour

Figure 1 Conceptual Model of ICT usage behavior among Business Education teachers in Nigerian tertiary colleges

Methodology
Research Design
This study has employed a survey research design and has used SEM to analyse and interpret the associations of PE and ATT (being exogenous variables) with behavioural intention and ICT usage behaviour (being endogenous variables). The study data was analysed using AMOS v21 in three important SEM stages, namely: assessing the confirmatory factor analysis (CFA); assessing the measurement model; and assessing the structural model (Hair et al., 2010). Data was screened for missing values and outliers and convergent validity and discriminant validity were established for all the constructs investigated in the study.

Participants
Participants of our study were 212 business education teachers from 13 tertiary colleges in Northwestern Nigeria. A majority of the respondents were males, at 134 (63.2%), while females were the minority, at 78 (36.8%). The average age of the respondents was 43 years of age (26 years being the minimum and 63 years being the maximum). Most of the respondents were degree/higher national diploma (HND) holders, at 107 (50.5%). Ninety-nine of them (46.7%) were first degree holders, while only six of them (2.8%) were doctoral degree holders. A majority of the respondents have worked for a period of two to eight years; while 44 of them (20.8%) have worked

for a period of nine to 14 years. Forty-two of them (19.8%) have worked for 15 to 20 years, while 20 of them (9.4%) have worked for 21 to 26 years. Only seven of them (3.3%) have worked for a period of 27 to 33 years as business education teachers. Most of the teachers were at the status of lecturers/instructors, at 72 (34%). Fifty-six of them (26.4%) were senior lecturers/senior instructors, while 42 of them (19.8%) were assistant lecturers/assistant instructors. Only 16 of them (7.5%) were principal lecturers/principal instructors.

Measures

A structured survey instrument was used with items adapted from previously validated works by Venkatesh and Bala (2008) for perceived enjoyment; by Teo (2010) and Venkatesh et al. (2003) for attitude towards ICTs; by Cheung, Lee and Chen (2002) and Davis (1989a) for behavioural intention, and by Kim (2008) and Venkatesh and Bala (2008) for ICT usage behaviour. Participants were asked to provide demographic information and to respond to 33 items on the four constructs in the study, namely: PE (six items), ATT (six items), BI (seven items) and USE (14 items). Each statement was

measured on a five-point Likert-type scale. For PE, ATT and BI, the measurement ranged from 1 = 'strongly disagree' to 5 = 'strongly agree'. For USE the measurements ranged from 1 = 'never' to 5 = 'very frequently' and from 1 = 'none' to 5 = 'very much'. All reversed items in the instrument were reversed-scored (DeVellis, 2003). Confirmatory Factor Analysis (CFA) was conducted on the 33 items in the survey instrument, and on the final analysis, only 13 items were retained (see Appendix A).

Results
Descriptive Statistics

To assess the normality of a set of data using AMOS, researchers usually report the skewness and kurtosis of such data. According to Byrne and Van de Vijver (2010), data may be assumed to be normal if its skewness is within a value range of ±2 and its kurtosis is within ±7. However, Kline (2011) opined that for a normal distribution of data, skewness should be within a value range of ±3, while kurtosis should be within a value range of ±10. Table 1, presents the results of skewness and kurtosis analysis on each of the items that measure the constructs of our study.

Table 1 Assumptions of skewness and kurtosis for normality of study data

Construct	Item	Mean	Standard deviation	Skewness	Kurtosis
Perceived enjoyment	PE1	4.32	0.72	-0.56	-0.91
	PE2	4.24	0.63	-0.23	-0.61
	PE6	4.38	0.61	-0.43	-0.65
Attitude towards technology	ATT3	3.90	0.79	-0.34	-0.33
	ATT4	4.12	0.68	-0.15	-0.82
	ATT5	4.25	0.67	-0.35	-0.79
Behavioural intention	BI2	4.53	0.53	-0.43	-1.18
	BI4	4.55	0.57	-0.81	-0.35
	BI5	4.55	0.58	-0.85	-0.26
Usage behaviour	USE2	3.06	0.96	0.23	-0.70
	USE4	3.38	0.96	0.02	-0.98
	USE10	2.93	0.93	0.42	-0.68
	USE13	3.43	0.87	0.07	-0.66

Table 2 Results for the measurement model

Latent variable	Item	b	SE	C.R.	p	β	R^2	AVE (>0.50)	CR (>0.70)
Perceived enjoyment	PE1	1.000				.887	.787	0.698	0.874
	PE2	.797	.055	14.616	***	.815	.664		
	PE6	.762	.053	14.251	***	.802	.643		
Attitude towards technology	ATT3	1.000				.680	.462	0.548	0.782
	ATT4	.821	.101	8.120	***	.654	.427		
	ATT5	1.077	.118	9.090	***	.869	.755		
Behavioural intention	BI2	1.000				.845	.714	0.886	0.958
	BI4	1.267	.057	22.154	***	.992	.984		
	BI5	1.269	.059	21.655	***	.979	.959		
Usage behaviour	USE2	1.000				.766	.587	0.542	0.825
	USE4	.847	.097	8.775	***	.649	.421		
	USE10	.968	.095	10.201	***	.762	.580		
	USE13	.903	.089	10.204	***	.762	.580		

*Note: b = unstandardised regression weight; SE = standard error of regression weight; C.R = critical ratio for regression weight; p = level of significance, *** $p < .001$, ** $p < .005$, * $p < .05$; β = standardised regression weight; R^2 = squared multiple regression; AVE = average variance extracted; CR = construct reliability.*

From Table 1, the means and standard deviations of teachers' responses on the indicators that were used for investigating the variables in our study could be seen. Among the constructs, indicators for ICT usage behaviour seem to have lower mean ratings, indicating low level of ICT usage among the respondents. The highest mean ratings are among the indicators for behavioural intention, indicating that teachers have high intentions for using ICTs in the classroom.

The Measurement Model

The measurement model of this study has sufficient number of valid indicators for each construct. In assessing CFA, the minimum number of indicators for each construct should be three, and each indicator should load above .50 (Hair et al., 2010). As can be seen on Table 2, there are at least three indicators for each construct investigated and the standardised regression weights of the measurement model for the indicators have ranged from 0.649 to 0.979, which indicates valid factor loadings for all the items in the model. The critical ratios of all the items were significant at 0.001 levels, and their multiple squared correlations (R^2) have ranged from 0.421 to 0.984, indicating that the items were explained by their predictions at a range of 42% to 97 percent.

Test of the measurement model

Average variance extracted (AVE) and construct reliability measures were used to test the convergent validity of the constructs in the measurement model of the study. When AVE of a construct is valid, it means the variance attributable to the construct in relation to the variance attributable to measurement errors are adequate (Fornell & Bookstein, 1982). For valid construct AVEs, values must be ≥ 0.50, which is indicative of adequate convergent validity. Table 2 shows that all the AVE values in the measurement model of this study are > .50, which means convergent validity is achieved. A construct reliability (CR) test was also conducted on all items to assess their reliability with regard to how they measure their respective constructs, where as a rule of thumb, all values must be ≥ .70 (Fraenkel, Wallen & Hyun, 2012; Pallant, 2010). Table 2 shows that each and every construct has valid construct reliability, with values ranging from 0.782 to 0.958. This additionally satisfies the condition for convergent validity for all the constructs (Hair et al., 2010).

The discriminant validity of the constructs in the measurement model was also tested by comparing the AVE of every given construct with the squared correlations between that construct and other constructs. If the AVEs are greater than the off-diagonal elements in the corresponding rows and columns, and are also greater than the squared correlations between a given construct and other constructs in the model, discriminant validity is considered to be adequate; otherwise it is considered inadequate. When the variance shared between a construct and any other construct in a model is less than the variance shared by the construct with its indicators, discriminant validity is said to be achieved (Fornell & Larcker, 1981).

From the correlation matrix on Table 3, the AVE values in all the diagonal elements are greater than the values of the squared correlations between one construct and the other constructs in the columns of the off-diagonal elements. This is an indication that all the conditions of discriminant validity have been achieved (Fornell & Larcker, 1981).

The Structural Model

Figure 2 depicts the structural model of ICT usage behaviour of business education teachers in Nigerian tertiary colleges. The model is made up of two exogenous variables, namely: PE and ATT, as well as two endogenous variables, which are: BI and USE. With only 13 indicators, our model has validly explained the trend of ICT usage behaviour among the target population of the study, satisfying all the model fit criteria (absolute, parsimonious and incremental fit indices) (Hair et al., 2010). This indicates the model's parsimony or simplicity in explaining ICT usage behaviour, with a lesser number of valid estimated parameters. The absolute fit measures indicates the extent to which the model fits with the observed covariance matrix, and the indices are: chi-square statistics, goodness of fit index (GFI) and the root mean square error of approximation (RMSEA); the incremental fit measures compare the proposed model with the independence or null model and the indices are: Tucker-Lewis index (TLI), normal fit index (NFI), comparative fit index (CFI), relative fit index (RFI), and incremental fit index (IFI) (Hair et al., 2010). The model has met with all the criteria for its goodness of fit: chi-square = 68.821, *df* = 59, relative chi-square = 1.166, GFI = .950, Adjusted Goodness of Fit Index (AGFI) = .923, CFI = .995, IFI = .995, TLI = .993, root mean square residual (RMR) = .020 and RMSEA = .028; and all its indices and factor loadings are satisfactory, indicating its stability in all theoretical parameters.

Table 3 Discriminant validity for the measurement model

Construct	Perceived enjoyment (PE)	Attitude towards technology (ATT)	Behavioural Intention (BI)	ICT usage behavior (USE)
Perceived Enjoyment	0.698			
Attitude towards technology	0.175	0.548		
Behavioural intention	0.626	0.186	0.886	
ICT usage behaviour	0.041	0.221	0.006	0.542

Chi-Square=68.821
DF=59
Relative Chi-Sq=1.166
p=.179
GFI (>=.9) = .950
AGFI (>=.9) = .923
CFI (>=.9) = .995
IFI (>=.9) = .995
TLI (>=.9) = .993
RMR (<=.08) = .020
RMSEA (<=.08) = .028
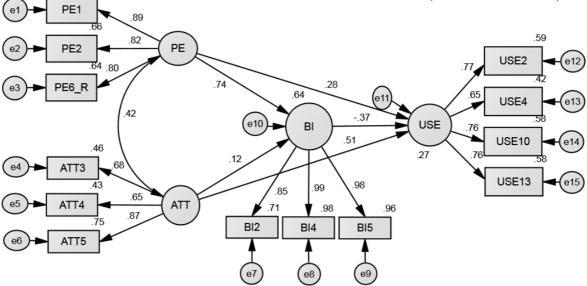(Standardized estimates)

Figure 2 Structural model for ICT usage behaviour among business education teachers in Nigerian tertiary colleges

Test of the structural model
The test result of the structural model has shown that all the five hypotheses of our study (H_1, H_2, H_3, H_4 and H_5) were supported by the study data (see Table 4). Perceived enjoyment (PE) has significant influence on ICT usage behaviour, as well as on behavioural intention; attitude towards ICTs has significant influence on behavioural intention, as well as on ICT usage behaviour; and behavioural intention has significant influence on ICT usage behaviour. However, behavioural intention has predicted a decrease over teachers' ICT usage behaviour, by its negative beta (regression weight) on ICT usage behaviour.

The test of the two endogenous variables in the study model (behavioural intention and ICT usage behaviour) has revealed that perceived enjoyment and attitude toward ICTs have explained about 64% of the variance in teachers' behavioural intention for using ICTs, with an R^2 of 0.638. Congruently, the combined influence of perceived enjoyment, attitude toward ICTs and behavioural intention have explained 27% of the variance in teachers' ICT usage behaviour, with an R^2 of 0.270.

Table 4 Results of the Tests of Hypotheses

Hypotheses	Paths	β	*p*-Level	Results
H_1	PE → USE	.281	.039	Supported
H_2	PE → BI	.740	***	Supported
H_3	ATT → BI	.122	.038	Supported
H_4	ATT → USE	.512	***	Supported
H_5	BI → USE	-.368	.005	Supported

Discussion
This study has explained the roles of two exogenous variables, that of perceived enjoyment and attitudes towards ICTs in determining teachers' use of ICTs

in the classroom, or their intention thereof. The study has shown that teachers will use or will intend to use ICTs when they perceive that the ICTs are enjoyable and when they feel favourably disposed towards them. These findings are consistent with the theoretical assumptions of TAM and the positions of studies such as Ajuwon and Popoola (2015), and Kroenung et al. (2015), where perceived enjoyment influenced use of technology; Van der Heijden (2004) and Verkasalo et al. (2010) where perceived enjoyment impacted on behavioural intention; Alharbi and Drew (2014) and Dishaw and Strong (1999), where attitude influenced behavioural intention; and Arekete et al. (2014), where attitude influenced technology usage behaviour.

Interestingly, our model has revealed that perceived enjoyment had the strongest influence on teachers' intention to use technology, and attitude toward ICTs had the strongest influence on teachers' self-reported use of technology in the classroom. Invariably, teachers' behavioural intention of using ICTs was more affected by their perceived enjoyment of ICTs, and their use of ICTs was more affected by their ICT attitudes. Unfortunately, teachers that participated in this study were not able to use ICTs in the classroom as much as they intended. Only 27% of the variance in their ICT usage behaviour was explained by perceived enjoyment, attitudes towards ICTs and behavioural intention. This implies that there are other important explanations associated with about 73% of the variance in teachers' ICT usage behaviour in the North-Western region of Nigeria. Being that authorities in tertiary schools of Nigeria and the rest of Africa would expect teachers not to stop at their intentions of using technology but to also use it, there is a need to compensate teachers' good intentions and attitudes towards using technology, with adequate ICTs and regular training programmes and incentives/policies to support their usage of ICTs in the classroom. Additionally, school authorities can combine the priority of the usefulness of ICTs with the pleasure derived from them by teachers to ensure that they make them adequately available for use. Although these findings have important implications for ensuring appropriate ICT uptake in Nigeria and the rest of Africa, further research may be needed to investigate how the perceptions, beliefs and attitudes of school leaders towards ICTs affect the appropriate integration and implementation of ICTs in schools across Africa. In the same vein, using self-report scales to measure the variables in this study suggests the possibility of common method errors and other unexplainable and unforeseen circumstances that might have affected the results of the study. Hence, further studies may employ experimental or qualitative designs to observe and investigate the phenomena of interest more closely.

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Appendix A: Constructs and Items Statements

S/N	Code	Item Statements (Subjective Norm)
1	PE1	I find ICTs to be enjoyable
2	PE2	The actual process of using ICTs for teaching is pleasant
3	PE6	* Using ICTs for teaching is not satisfying

S/N	Code	Item Statements (Attitude towards ICT usage)
4	ATT3	I look forward to those aspects of teaching business education that require the use of ICTs
5	ATT4	Using ICTs for business education classroom functions is pleasant
6	ATT5	ICTs make business education classroom interactions more interesting

S/N	Code	Item Statements (Intention to use ICTs)
7	BI2	I expect to use ICTs next semester to administer lectures
8	BI4	To the extent possible, I would use ICTs in business education classrooms frequently
9	BI5	I intend to use ICTs for general teaching purposes regularly

S/N	Code	Item Statements (Actual ICT Usage)
10	USE2	How frequently do you use ICTs in administering business education lectures?
11	USE4	How frequently do you use ICTs in preparing continuous assessment tests and examinations?
12	USE10	How much classroom functions do you perform with ICT tools each day (*exempli gratia* (e.g.) administering lectures, tests and examinations)?
13	USE13	How much business education related tasks do you execute with ICTs?

Note: * Reversed items.