ICT ADOPTION ATTITUDE OF LECTURERS

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ABSTRACT: *With ex post facto research method, this study investigated the attitude of lecturers towards the adoption of Information and Communication Technology, abbreviated as ICT, in teaching and research in federal and state-owned universities in Nigeria. Four research questions and null hypotheses were respectively, answered and tested. A stratified sample of 400 lecturers (251 males and 149 females) was randomly drawn from one federal university and one state university. A factor analyzed 55 items instrument with high construct validity and three-factor loadings was used for data collection. The reliability of the instrument, using the Cronbach alpha method, showed reliability coefficients of 0.67, 0.62, and 0.51 for attitude, competence, and accessibility factor loadings, respectively. Data analysis was done with the use of independent samples t-test and One-way ANOVA for testing the hypotheses. Results revealed that gender and area of specialization have no significant difference in the attitude of lecturers' towards ICT adoption in teaching and research. On years of experience, moderately and less experienced lecturers are more competent in the use of ICTs than their highly experienced counterparts. ICT facilities are significantly more accessible the Federal university (University of Port Harcourt) than the State university (Rivers State University of Science and Technology). University management should motivate and encourage lecturers to participate in ICT training programs, lecturers especially highly experienced should be well motivated to develop their ICT competence.*
KEYWORDS: Attitude, ICT, Gender, Years of experience, Area of specialization, ICT competence, and ICT access; Adoption of ICT, Attitude, Lecturers, Federal universities, State universities, Information and Communication Technology.

INTRODUCTION

The importance of information and communication technology in individual development has gained growing attention among developed practitioners, government, policy makers and civil society in current years owing to the growing increase of the internet, merging in Information technology and telecommunications technologies and increasing globalization. Bandele (2006) opined that ICT is a revolution that involves the use of computers, the internet, and other telecommunication technology in every aspect of human endeavor. Information and communications technology has the potential to improve all aspects of our social, economic and

9

cultural life. Kpolovie (2011 page 455) "avers that ICT is the science of production and utilization of computer equipment, subsystems, software and firmware for the automatic analysis, acquisition, storage, manipulation, management, movement, transformation, control display, interchange, transmission and retrieval of data (quantitative and qualitative information) to most appropriately meet human needs." The institution of ICT in the delivery of the core services of teaching and research by universities clearly changed the way higher that education is executed (Ololube, Kpolovie & Makewa, 2015). ICT in learning depends on effective communication of human knowledge, which either occurs in synchronous or asynchronous and blended learning situation as the case may be. This new development is strong indication that the era of teachers without ICT skills are gone. Any classroom teacher with adequate professional skills in ICT utilization will definitely have his students perform better in classroom learning. Somekh (2008) opined that pedagogical adoption of ICT is challenging and require an incorporation of vision, system-wide experimentation and new roles and relationships for teachers and students. ICTs when used in ways that make use of their affordances are a powerful driver for change.

ICTs can help to make schools less stressful workplaces for both teachers and students. ICT has so revolutionized all spheres of human endeavor to the extent that effective ICT use or otherwise in any given area is synonymous with the success or failure, respectively of that field (Kpolovie & Iderima, 2016; 2016b; 2013; Kpolovie, Iderima & Ololube, 2014). Understanding the role ICT plays and how to personally make the best use of ICT is an essential requirement for any person or organization that is seeking competitive advantage over others. Everyone and indeed every organization necessarily needs to be effective and efficient in the use of ICT as a real success in today's changed, rapidly changing and highly competitive world depends on such knowledge and skills (Kpolovie, 2016; 2016a; 2016b; Kpolovie & Iderima, 2016; 2016b). Refusal to embrace the opportunities offered by ICT today is tantamount to absolute failure in any field of human endeavor that one is engaged in (Kpolovie, 2006b).

Attitudes are a tendency to react negatively or positively to some degree towards persons, ideas, objects, things, and institutions (Ajzen, 2000). According to Idaka cited in Williams and Iruloh, (2014), if the attitude of a person toward a given object is known, it could be used in conjunction with other situational variables to predict and explain the reactions of these individuals towards that object. Attitudes influence man's response to objects, situations, products, and persons. Attitude in a general sense is seen as intensity and direction of the sum total of a person's inclinations, feelings, prejudices or bias, conceived notions, ideas, fears and other convictions about any specific objects or products (Kpolovie, Joe & Okoto, 2014; Kpolovie, 2014; 2002; Idaka, 2005). Some people have an attitude while some other may have an unfavorable attitude towards a given social object. To some, attitude could be high, low, good, poor, positive and negative in their intensities or directions (Williams and Iruloh. 2014). Although many teachers

believe ICTs are an important component in education their lack of knowledge and experience lead to a lack of confidence to attempt to introduce them into their instruction.

ICT competence as used in this study refers to the ability of a University teacher to make use of the various ICT tools such as e-mail, the Internet, World Wide Web, intranets, extranets, online database and other networking technologies in teaching and research. Successful incorporation of ICT in the university education system relies heavily on the competence and the attitude of teachers towards the role and use of modern technologies in teaching and learning (Kpolovie, 2007b; 2007; 2014b). Thus, experienced teachers, newly qualified, and student-teachers need to be confident in using ICT effectively in their teaching (Kyriakidou, Chrisostomou, & Bank as cited in Yusuf and Balogun, 2011). Simply having ICT in schools will not guarantee their effective use. In spite of the quantity and quality of technology placed in classrooms, the key to how those tools are used is the teacher; therefore, teachers must have the competence and the right attitude towards technology. ICT Accessibility is a term used to describe the degree to which ICT is accessible (Kpolovie & Iderima, 2016; Kpolovie & Obilor, 2013b; Ololube, Ajayi, Kpolovie & Usoro, 2012) by as many people as possible.

Accessibility can be viewed as the ability to access the functionality and possible benefit of some system or entity. Regarding ICT accessibility is about making sure services and information can be used by a wide range of people. It is also about adjusting computer equipment to enable users to be more productive. Norris, Sulliva, and Poirot cited in Akpan, Ima-Obong, and Obot (2011), maintain that the importance of accessibility as teachers' use of technology for a curricular purpose is almost exclusively a function of their access to that technology. Merely providing schools with hardware, software and in-service training is not enough. Any in-service training needs follow-up support, peer coaching, and peer dialogue to ensure successful utilization of new technologies.Gender defines what is expected, permitted and esteemed in women or men in a particular context. Gender is the variety of features relating to, and distinguishing between, male and female. In Nigeria, gender differences in ICT use are linked to patterns of discrimination in the society and with patterns of power relations within the home concerning ownership and use of ICT gadgets.

Bada, Adewole, and Olaekan. (2009), examined the uses of computers and its relevance to teaching and learning in Nigerian secondary schools. The need for computer education and its objectives in Nigerian educational system were identified and discussed. The roles the classroom teachers would play and the challenge they would have to face in using the computer for instruction were also highlighted. Possible solutions were made to ensure successful implementation of computer education program in Nigerian secondary schools.

In addition to gender and other teachers' personal characteristics previous research suggests that teachers' attitudes towards ICTs are also related to teachers' computer competence. In their study

of the correlation between teachers' attitude and acceptance of technology, Pelton and Pelton in Abdulkai (2004), maintained that although many teachers believe computers are an important component of a students' education, their lack of knowledge and experience lead to a lack of confidence to attempt to introduce them into instruction.

The ICT users in Nigerian universities, on the other hand, include males and females with different social, economic and psychological backgrounds. So the researchers presumed that variations in universities lecturers' attitudes towards the use of ICT could be influenced by some factors or variables which may include social, economic and psychological factors such as gender, years of experience, the area of specialization, ICT competence, and ICT access. These variables were considered in this study to ensure maximum control of extraneous variables.

The necessity for the development of ICT is a worldwide resolution and has been a subject of great worth to all mankind. ICT has become an essential part of the majority of organizations that seek a competitive edge. Kpolovie (2016g, 457) has therefore asserted that:

The world has experienced several revolutions. All, except one, of the revolutions from Dark Ages to date involved some form of coercion and even bloodshed but yet never impacted or changed the world for better as much as the only exceptional one, Information and Communication Technology (ICT), has done. Information and Communication Technology is the science of production and utilization of computer equipment, subsystems, software and firmware for the automatic analysis, acquisition, storage, manipulation, management, movement, transformation, control, display, interchange, transmission and retrieval of data (quantitative and qualitative information) to most appropriately meet human needs.

Higher education institutions should be highly computerized, and all lecturers should be able to use ICT facilities to enhance their working methods (Ololube, Kpolovie & Makewa, 2015). In higher institutions of this century, learning is expected to be blended in nature where a student can assess the institutions and other libraries at the comfort of their homes. For this to be done, the lecturers and other personnel of our institutions should be upgrading and updated their computer skills. In developing countries, Nigeria specifically, preface investigations prove that only a few organizations in the economy have adopted the IT, but there has not been a formal study to determine the level of diffusion and the factors affecting its efficiency on organizations.

A large number of studies showed that teachers' computer competence is a significant predictor of their attitude towards computers (Berner, 2002). Al-Oteawi, in Abdulkai (2004), found that most teachers who showed negative or neutral attitudes towards the use of ICTs in education lacked knowledge and skill about a computer that would enable them to make an informed decision. Most studies examining computer attitude have also reported a significant association between computer access and teachers' attitude towards them Pegrum, as reported in Abdulkai. (2004) in his study of Korean teachers found a positive correlation between teachers' attitude towards computer and ownership and accessibility to school computers, the level of accessibility

and number of computer locations in the school, concluded that there was a significant relationship between the proximity of computers and attitude towards computers.

Emmanuel Chiaka and Edna. (2014), examined the extent to which Information Communication Technology (ICT) is integrated into various school subjects in the curriculum as well as students' utilization of and access to ICT, to establish fact unit implications to e-learning. Data were collected from 105 Form 2 Junior Secondary School students from four Federal Unity Schools (FUS) in South Eastern Nigeria. The questionnaire was used for data collection that was analyzed descriptively and quantitatively using frequency, percentages, charts, and cross tabulation chi-square to test the null hypotheses. Findings indicate that except for computer studies, ICT was not integrated into other school subjects in the curriculum. Although ICT is seldom used, the level of ICT integration into the curriculum has no significant influence on the level of ICT utilization. Alternatively, students' access to ICT package, has a significant influence on ICT utilization; the majority (66%) never had access to ICT usage. Recommendations were directed towards government assistance in equipping Federal Unity Schools with adequate facilities, teachers' preparation towards ICT usage as well as monitoring and assessment of ICT utilization.

In Nigeria today, individual may not use ICT service for different reason ranging from lack of interest, illiteracy, lack of awareness, exorbitant rate of service, poor quality of service and low per capita income (Kpolovie & Obilor, 2013; 2013a; 2013b; 2013c; 2014; Kpolovie, Obilor & Ololube, 2015). In Nigerian universities, financial dealings are more or less online but the areas of data assessment such as semester's results, GPAs, lectures timetables, and lectures note are still an important issue that has not been attended to with the use of ICT even when fees have been charged for the needed ICT facilities. These issues are posing many questions begging for answers. Are the lecturers not well informed of the used of ICT? Are they not familiar with ICT facilities? Are ICT facilities not accessible in our universities? Is it that lecturers lack the necessary ICT competence? Why are students' results not accessible online? Why can't we assess lecturers' notes online? Why is it that many lecturers have only very few publications that which readily available on the World Wide Web? Have the lecturers not known the benefits of the use of ICT in the various sphere of life? It is against this background that this present study tends to investigate lecturers' attitude towards the adoption of ICT in teaching and research in the Federal and State universities in Nigeria.

This investigation therefore aimed at determining the attitude of lecturers towards ICT adoption in Nigerian universities. Specifically, the study was designed to achieve the following objectives:
1.   Examine the attitude of male and female lecturers towards ICT adoption in teaching and research in federal and state universities.

2. Determine the attitude of Science, Arts, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers towards the adoption of ICT in teaching and research in federal and state universities.
3. Examine the level of competence of lecturers, based on years of teaching experience (less experienced, moderately experienced and highly experienced) in the use of ICT facilities in teaching and research in federal and state universities.
4. Examine the accessibility of ICT facilities for teaching and research in state and federal universities.

Four corresponding research questions were therefore posed for the study as follows:
1. What is the attitude of male and female lecturers towards ICT adoption in teaching and research in federal and state universities?
2. What is the attitude of lecturers from different faculties (Arts, Science, Engineering, Agriculture, Health Sciences, Education, Social Science, and Management Sciences) towards the adoption of ICT in teaching and research in universities?
3. What is the level of lecturers' competence on the basis years of teaching experience in the adoption of ICT facilities in teaching and research in universities?
4. What are the level of accessibility of ICT facilities for teaching and research in Federal and State universities?

The following null hypotheses were postulated and tested at 0.05 alpha in accordance with the what, why, how, and which of hypothesis postulation (Kpolovie, 2011b).
1. There is no significant difference between the attitude of male and female lecturers towards ICT adoption in teaching and research in the universities.
2. There is no significant difference between Science, Arts, Agriculture, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers' attitude towards ICT adoption in teaching and research in the universities.
3. There is no significant difference between less experienced, moderately experienced and highly experienced lecturers' competence in the use of ICT facilities in teaching and research in the universities.
4. There is no significant difference between accessibility of ICT facilities in State and Federal universities.

LITERATURE REVIEW

Information and communication technology refers to computer centered tools adopted by individuals to meet the information processing needs of an organization. Its purview covers computer software and hardware, the network and other digital devices like audio, video, camera and so on, which translate information (text, sound, motion, etc.) into digital form (Moursund and Biefleldt, 1999; Ololube, Amaele, Kpolovie & Egbezor, 2012).

ICT comprises all programmed means of teaching/researching with the help of computers and web-related resources. ICT refers to the set of technologies that are functional in the process of collecting, storing editing, retrieving and transferring of information in various forms (Olakulehin, 2009). The Federal Ministry of Education, Nigeria (2010a) defines ICT as incorporating all tools (inclusive of outdated technologies of radio, video and television to the fresher technologies of computers, hardware, firmware etc.), as well as the approaches, practices, processes, procedures, concepts and principles that come into play in the conduct of the information and communication activities.

Adoni and Kpangbam. (2010), described information and communication technology (ICT) as electronic technologies used for information storage and retrieval. According to the online Oxford Dictionary, information and communication technology usually abbreviated as ICT, is often used as a drawn-out substitute for information technology (IT), but it is usually a more general term that stresses the role of integrated communication and integration of telecommunication (telephone lines and wireless signals), computers, middleware as well as necessary software, storage, and audio-visual systems, which enable users to create, access, store, diffuses and direct information (Ololube, Ajayi & Kpolovie, 2011; Ololube, Amaele, Kpolovie, Onyekwere & Elechi, 2012). In other words, ICT entails IT as well as telecommunications broadcast media, all types of audio processing and transmission and network based control and monitoring functions.ICT as described by Scott (2002), incorporates a range of applications, communications, and technologies which aid information recovery and research communications and administration. These embrace online database, library services, and online services as well as the fax machine (Tomie, 2013).

According to Timiyu (2003), Information and Communication Technology (ICT) includes electronic technologies for creating, acquiring, storing, processing, communicating and using information. Timiyu classified ICT along two broad dimensions: the content-conduit facet and the service product dimension. Content-oriented ICT consist of the digital creation and publishing of information or content (e.g. database products, electronic books, and websites). Conduit- oriented ICT offers the guide or media for storing and transmitting of this information (e.g. telephone network). The product-oriented approach, on the other hand, embraces all physical objects or equipment used for information processing or transmissions like computers, cellular phones, and TV transmitters.

While service oriented ICT accentuates the provision of information services including bulletin board services, online search engines, radio broadcast services. Communication technologies include all media employed in transmitting audio, video, data, and multimedia such as satellite, cable, fiber optics, wireless (radio, infra-red, Bluetooth, Wifi). Network technologies include personal area networks (PAN), campus area network (CAN) intranets, extranets and the Internet. Computer technologies include all portable media such as optical disks; disks flash memories,

15

video books multimedia projectors, interactive electronic boards and constantly evolving state of the art PCs. Mobile technologies include mobile phones, PDAs, palmtops (Illoanusi and Osuagwu, 2010).

A proper understanding of the relevance of ICT and how to individually utilize it is a prerequisite for any organization that is seeking competitive advantage over others. Everyone and indeed every organization necessarily needs to be current and proficient in the use of ICT as a real success in today's changed, rapidly changing and highly competitive world depends on such knowledge and skills. Refusal to embrace the opportunities offered by ICT today is tantamount to absolute failure in any field of human endeavor that one is engaged in (Kpolovie & Iderima, 2016; Kpolovie, 2011).

Adeogun (2003) stressed that ICTs had destroyed the hurdles of time, distance, and location which use to obstruct the growth of formal education. Information and Communication technology have also had a reflective impact on the pattern and quality of lecture delivery (Mogbo 2002). Speedy development of ICTs has led to many changes in responsibilities of academics in tertiary institutions. The dated methods of doing academic work are fast becoming inappropriate. Ehikahamenor (2002) indicated that ICTs are altering the ways in which academics hunt for information, communication with each other, conduct research and dispense research results. All these point to the fact that information and communication technology are very vital for effective teaching, learning and research activities in an academic setting.

Kumar and Kaur (2005) asserted that the present information revolution and increasing impact of information and communication technologies had updated the process of learning and research in most Nigerian Universities. Tinio (2002) made a similar observation, noting that ICTs are powerful enabling tools for educational change and reform. When appropriately used, ICT helps to increase access to education, reinforce the significance of education to the workplace, and raise educational quality by creating an active process linked to real life. In Nigerian educational system, ICT has facilitated increase access to and improving the relevance and the quality of education. It significantly expedites the acquisition and absorption of knowledge, posing developing countries astonishing opportunities to enhance educational systems, improve policy formulation and implementation and broaden the range of opportunity for business and poverty alleviation (Kpolovie & Ololube, 2013). This new communication tends to lessen the sense of segregation and open access to knowledge because ICT offers access anytime and anywhere by making possible asynchronous learning possible. Online course materials, for example, can be accessed 24 hours a day, seven days a week. ICT-based educational delivery like educational programming broadcast over radio and television, dispenses education without the need for all learners and the instructor to be in one location.

Darkwa and Anao in Umeagwu and Etu (2014) underlined the impact of ICT on the tertiary institution as improving both academic and business research by university and polytechnic

lecturers and students. With the influx of internet facilities, researchers can have the opportunity to access a lot of information for various assignments in a more contemporary way. ICT reduces administrative cost. The telephone is luxurious in developing countries where many filing and records keeping are done manually. The use of internet, intranet, and extranet could reduce administrative cost because the same information on the internet can be sent to all department without having to do it independently. ICT has disentangled the problem of the task of the university and polytechnic lecturers with the current state of severe shortage of academic facility and staff facing our tertiary institutions. ICT could be leveraged through video conferencing so that students on various campuses pursuing the same or similar academic programs could be connected at the same time to benefit from a lesson which they lack lecturers (Kpolovie, 2010a; Tomie, 2014). Specialist's systems, wireless networks, interfaces, virtual collections, virtual reference services and portals have brought academic independence and reward system often based on research, concern about intellectual property rights and shared rights between faculty, institutions and technologies (Ranzan in Umeagukwu, et al., 2014). Lecturers in tertiary institutions, mainly in the university system are concerned mainly with two things: teaching and research with additional administrative assignments. ICT adoption has the potentials of lessening the administrative duties. In teaching and learning in a university system, information and communication technologies offer numerous opportunities in the higher educational system (Kpolovie, 2010a; 2016).

Firstly, ICT can be used as a means of preparing the present generation of students for the future workplace, and as means of providing tools for tomorrow's practices. Lerfke in Yusuf (2004) noted among other things that today's students live in a worldwide knowledge-based age, and they deserve teachers whose practice can embrace the best that technology can bring to learning. Through teachers' use of ICT facilities, students can easily be given the opportunity of becoming part of the knowledge age and skills communicated to young people in an increasingly intricate world. Lecturers will need to use ICTs in order to prepare tomorrow's' employees and customers with required competence and knowledge to use ICT within their work. Secondly, ICTs can make school more resourceful or more productive, stimulating a variety of tools to support and facilitate teacher's professional accomplishments (Kpolovie, Ololube & Ekwebelem, 2011). Finally, ICTs are seen as a means for improvement and modernization of teaching to excite learners to learn much more actively and independently in a self-directed way and/or in alliance with others (Krischner and Woperies 2003) as done with Massive Open Online Courses, just referred to as MOOCs or xMOOCs (Kpolovie & Iderima, 2016; 2016b). ICT can be adopted to enhance teaching and learning in an unusual way in the university system (Ololube, Kpolovie & Makewa, 2015; Ololube & Kpolovie, 2012).

Collis and Moonen (2010) made a division in the literature between learning about ICT and learning with ICT. These discrepancies are important if lecturers are to integrate ICTs in their instructional delivery process. The first state of ICT applications in schools is teaching about ICT

17

which is called topicality that is ICT is the topic. A higher level of that development teaching with ICT or through ICTs, that is, the presentation and distribution of instructional content through web environments (e-teaching) or systems offering an integrated range of tools (stand-alone computer instruction, CD-ROM among others) to support learning and communication.

It is not enough to get Information and Communication Technology into university system without its appropriate implementation in the delivery of quality instruction (Kpolovie & Iderima, 2013). Even in developed countries, knowledge and skills of ICT and competence in its use do not guarantee their use with students. Krischner and Davis in Onaanya, Shehu, Oduwaiye and Shehu (2010) summarized the competencies required by teachers/lecturers in ICT application in education to include:

a) Competent in personally making use of ICT,
b) Competent mastery of a range of educational models that make use of ICT as delivery modes;
c) Competent to make use of ICT for teaching;
d) Competent mastering of a range of assessment models which make use of ICT;
e) Competent in understanding the policy dimensions of the use of ICT for teaching and learning.

Milken Exchange on Education Technology cited by Onasanya et al. (2010) acknowledged three major ways of using ICT for teaching and learning. These are information Technology (IT) assisted learning, technology as a tool, and information science. Similarly, the Association of African Universities cited in Onasanya et al. (2010) identified some applications of ICT in teaching and learning that include:

a. To offer basic computer literacy skills
b. To provide basic computer literacy skills applicable to individual academic disciplines
c. To develop access to isolated resources
d. To advance communication skills
e. To develop higher order thinking skills
f. To offer content (e.g., group work tools for group assignments on the internet)
g. To develop course management (both in the regular curriculum and in distance education)
h. To collaborate in online teaching and learning with other faculty and students around the world.

Abimbade, also in Onasanya, et al. (2010) recounted the benefits of ICT to lecturers in the areas of teaching as:
1. Boost, the time learners, dedicate to learning,
2. Upsurge the speed of accessibility of data and information,
3. Provide instant feedback,

18

4. Assist less qualified teachers and

5. Enhance teachers' efficiency and effectiveness. He further explains that one needs to be literate in the use of computers to effectively use them in teaching.

The chestnut "publish or perish" is quite trendy in the university setting. This slogan stresses the importance attached to research in any university. In fact, it is the major indicator of an academic staff quality and determinant of progress. Research which is "the logical, systematic and objective collection, analysis, synthesis, evaluation and recording of accurate and controlled observations for the development of generalizations, principles or theories that ultimately aimed at description, explanation, prediction and control of natural phenomena to meet specific needs of man" (Kpolovie, 2016, 2; 2010b, 3; 2016a; 2011b) can best be done with application of ICT (Kpolovie, 2011c; 2012; 2012b; Kpolovie & Adaka, 2003; Kpolovie & Emekene, 2016; 2016b). The importance of the role ICT plays in research cannot be over-emphasized in research designs and execution of experimental, descriptive studies, statistical analysis, data production and storage and dissemination of research information. It is perhaps for reasons like these that Colwell (2000) asserted: "no field of research will be left untouched by the current blast of information and information technologies."

Indeed, science used to be composed of two actions: theory and experiment. But in the current Information Age, a third component which is Information and Communication Technology can correctly be added to make three component (Theory, experiment, and ICT). Specific areas of the relevance of ICT to lecturers and students in the areas of research cover a very wide range. First, information and communication with one another through newsgroups, e-mail lists, and chat rooms. These ICT resources enable communication among scholars as they can post research, assignments book or journal lists references to on-line materials. Problems and solutions can be discussed between researchers and scholars can react to the work of others in an electronic manuscript. The bounds for professional peer review has been made limitless with the adoption of ICT. Information Communication and Technology further provides greater opportunities for research cooperation and networking among scholars spread all over the world. Thus the national and international aspect of research issues can be studied as they can allow for communication with peers and experts around the universe. Through collaborative knowledge building, studies can focus transnational trend analysis through human and instrumentation collaboration. Secondly, ICT can assist research in any discipline as it provides faster and easier access to most comprehensive and present-day information through digital libraries that provide digitized full-text resources to learners and researchers. Others are the Electronic List - a directory of scholarly and professional e-conferences containing relevant topics and articles relevant to researchers, and electronic reference desks or virtual libraries.

Others consist of catalogs, electronic journals, and image database. Other Internet resources, gopher, and CD-ROM can provide a researcher with current, in-depth, immediate information.

Thirdly, ICT can be used to do complicated mathematical and statistical calculations which are essential in research. They can be utilized for data manipulation and analysis. Adoption of ICT in research will enable the assembling of data on time, the performance of accurate and very swift statistical analyses. In fact, sophisticated statistical analyses are not only performed promptly but also more accurately than possible manually. The ICT adoption equally offers researchers with a ready opportunity for the dissemination of research reports and findings. Publication outlets include e-books, e-journals or through personal Websites. ICTs provide ready means for production of research reports. Furthermore, digital video, audio, software simulation, synchronous and asynchronous chats and interactive software, among others, bring vitality in describing a method or reporting result (Middleton, in Yusuf and Onasanya 2004), but are virtually not employed in Nigerian higher institutions of learning (Ololube, Umunadi and Kpolovie, 2014). Functional platforms for delivery of Massive Open Online Courses (MOOCs) are yet to be developed in Nigeria (Kpolovie & Iderima, 2016). Even application of particular test development theories like Item Response Theory (IRT) that are intensively ICT based are very novel in Nigeria (Kpolovie & Emekene, 2016b; 2016; Joint Admissions and Matriculation Board, 2016).

In developing countries, Nigeria precisely, pilot investigation of this research showed that only a few organizations in the economy had adopted ITC for rendering their professional services; and that there has not been a formal conclusive study to define the level of flow and the factors affecting its effectiveness on organizations. Lecturers' attitude towards the adoption of ICT in the execution of research and teaching/learning activities has not been duly investigated. This is the great knowledge gap that the current investigation is set out to fill.

According to Achimugu, Oluwagbemi, Oluwaranti and Afolabi (2009), the adoption of Information and Communication Technology in the developing countries is one of the most demanding recent developmental issues. Since ICT usage became commercial in the early 1990s, spread rapidly and exponentially in developed countries, the developing nations are very slowly trying to learn its use. Nigerian universities are yet to appreciably integrate ICT into its curricula to have a better direct impact on economic growth in the current world of e-commerce, e-governance, e-learning, and e-everything Kpolovie, 2012c; 2014b).

In the case of Nigeria today, individuals may not use ICT services for different reasons ranging from lack of interest, lack of awareness, outrageous rate of service, illiteracy, poor quality of service, low per capita income, and epileptic power supply (Ololube, Umunadi & Kpolovie, 2014; Kpolovie & Obilor, 2013; 2013a; 2013b; 2013c; 2014; 2015; Kpolovie, 2002; 2006b). The United Nations and the Organization for Economic Cooperation and Development have recognized four key sets of indicators for comprehensive information technology diffusion in a country (OECD, 2015; Chiemeke & Longe, 2007) as follows:
(a) ICT infrastructure and access

(b) Access to and use of ICT by households and individuals
(c) Use of ICT by business
(d) ICT sector and trade in ICT goods.

When teaching and learning process is evaluated critically in higher institutions in Nigeria, it could be observed that the challenge for lecturers is no longer in passing on the course contents or in adopting teaching pedagogy, but it is in having access to ICT and using it to effectively deliver teaching and learning experiences (Olofe, 2005).

Concept of Attitude
The word attitude implies the sum total of an individual's positive and negative predisposition or mental state of preparation for action or in response to a social object (Kpolovie, Joe & Okoto, 2014). Attitude is rooted in one's beliefs, and it influences the individual's behavior towards a social object. Attitude signifies the way in which we view the world and establish our relationships. Attitudes are ways of thinking, feeling and behaving. They represent a person's likes and dislikes, attraction or aversions to persons, things or ideas or any other aspect or our environment. An attitude is an evaluation of a person's positive and negative predispositions towards an object, being or a thing, ranging from extremely negative to extremely positive (Kpolovie & Iderima, 2016; Meltzoff, 2007; Ololube & Kpolovie, 2012; Reisberg, 2006; Sternberg, 2006; Waltz, Srickland & Lenz, 2016). Most current perspectives on attitudes also permit that individuals could also have clashed hesitant feeling towards an object by concurrently holding both positive and negative attitudes towards the same object (Wood, 2000). An attitude may be as a positive or negative appraisal of people, objects, events, activities and ideas (Vadum & Rankin, 1998; Groth-Marnat & Wright, 2016; Jackson, 2006; Kaplan & Saccuzzo, 2005). The social object to which attitude is expressed could be concrete, abstract or just about anything in the environment that there is a debate about precise definitions. Hsu, Wang and Chiu (2009) define attitude as a psychological tendency expressed by evaluating a particular entity with some degree of favor or disfavor. Though it is sometimes common to define an attitude as affect towards an object, affect (i.e. discrete emotions or overall arousal) is largely understood to be different from attitude as a measure of favorability (Azjen and Fishbein, 2005). Further, Kian-Sam, Chee-Kiat (2002) posit that attitude may influence the attention to an object, the use of sets for encoding information and the interpretation, judgment, and recall of attitude-relevant information. In reacting to the importance of attitude one may ask what it means for one to have a negative attitude towards Information and Communication Technology. Attitude can be defined as a way of being "set" for or against something (Murphy, Murphy & Newcomeiller, 2002). This definition includes both a motivational perspective (e.g. a state of readiness to act or respond) and a cognitive perspective (e.g. the individual's beliefs and cognitions). An attitude is an internal state that influences behavior. We can infer these internal states from a person's actions and words. We can, therefore, say that an individual who actively

avoids ICT has a negative attitude towards it. In general, an individual will tend to avoid ICT because of his or her conceptions, beliefs and cognition.

From the preceding, it can be deducted that an attitude is highly dependent on past experiences and how these past experiences influence the individual (Myers, 1987) as he or she approaches new situations. In this sense, learned cognitions have affected an individual's perceptions about ICT (Masquita & Peres, 2015; Nafuho & Irby, 2015). A variation in the individual's attitude and response to ICTs will entail a change in the person's cognition about them. Both internal and external factors affect attitude adjustment. Teachers' attitude is a major determinant of the use of new technologies in an instructional setting. For instance, the teachers' attitude towards ICT shapes not only their experiences but also the experience of the students they teach. According to Zhao and Ziko (2001), three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the usefulness of technology, they should also think that the use of technology will not cause any conflicts, and finally teachers should understand that they have control over the technology.

ICT Competence is defined as the ability to combine and apply relevant characteristics to particular tasks in specific settings. These attributes include high levels of knowledge, skills, values, personal dispositions, sensitivities and capabilities, and the ability to put these blends into practice in a suitable way (Commonwealth Department of Education, Science, and Training, 2002). An ICT competency describes what a teacher should know and be able to do with technology in professional practice. An ICT standard is a mixture of attributes describing a teacher's professional performance involving the use of ICT. The ICT competence as employed in this study refers to the ability of a university teacher to make use of numerous ICT tools and facilities such as e-mail, the Internet, software applications, etc. in the performance of his research and teaching/learning responsibilities.

ICT Accessibility is a term that is used to describe the degree to which ICT is accessible by many people as possible. Accessibility can be seen as the ability to access and the actual frequent application of that ability in utilizing the functionality and possible benefits of ICT tools, facilities, systems or entities (Kpolovie & Iderima, 2016). Access to ICT infrastructure and resources in schools is a necessary condition to the adoption of ICT in Education. Effective adoption and integration of hardware and software ICT facilities into teaching/learning transactions and research engagements in universities and other tertiary educational institutions is indispensable for quality education delivery (Kpolovie & Iderima, 2013; Ololube, Kpolovie & Makewa, 2015; Kpolovie & Obilor, 2013a; 2013b; 2013c; 2014). Obviously, if teachers cannot access ICT resources, then they will not use them. Therefore, access to computers and updated software are key elements to effective adoption and integration of ICT in higher institutions of learning. Accessibility barriers occur when the design of ICT fails to allow for variation in users' abilities. Regarding ICT, accessibility is about making sure services and information can be used

22

by a wide range of people. It is also about making adjustments to computer equipment to enable staff, volunteers and service users to be much more productive (Okeke & Kpolovie, 2006; Ololube & Kpolovie, 2013).

Gender is a set of characteristics or traits that is related to sexuality identity of male or female, masculinity or femininity; and the socio-cultural constructs that society assigns to men and women. The basis of such constructs is shaped by ideological, historical, religious, ethnic, economic and political inequity, where men's activities and their gender attribute are perceived as essentially superior to those of women.

In Nigeria, gender differences in ICT use may be linked to patterns of discrimination, and power relations within the home in the society. Gender differences and the use of ICT have been reported in several studies. However, studies concerning teachers' gender and ICT use cited female teachers' low levels of computer use as a result of their limited technology access, skill, and interest. The male lecturer is said to use more ICT facilities in their research, teaching and learning processes than their female counterparts (Ololube, Amaele, Kpolovie & Egbezor, 2012; Ololube, Kpolovie, Amanchukwu & Briggs 2013; Ziliak & McCloskey, 2008). Some studies have shown that gender variables were not a predictor of ICT adoption into teaching and research. For instance, Onasanya, et al. (2010) found that gender has no significant effect on lecturers' attitude towards the use of ICT facilities in tertiary institutions of learning, though female lecturers should be encouraged to face the challenge of new technology.

Years of experience refer to the length of practice of a given profession. In this study, years of experience refer to the number of years that a lecturer has been in the profession, and it is categorized as highly, moderately and less experienced. Perhaps, teachers' experience in teaching could influence their use of computer technology in teaching. If teaching experience influences the successful use of ICT in the classroom, new lecturers must be induced to develop the needed skills in the use of ICT and to develop a positive attitude towards their use for teaching and research while old lecturers' should be encouraged to have a basic knowledge of computer appreciation.

Having and implementing a very good **ICT policy** is the bedrock for the national development of every any nation in the Global Village that we live in (Kpolovie, 2012). Information and Communication Technology has since become the core basis for national survival and development in current rapidly changing Information or Knowledge Age (Kpolovie, 2012c). The growth of a nation can correctly be defined regarding the number of its citizens who effectively and efficiently employ ICT to productively meet human needs. It is for this reason that that ICT has become an important factor in distinguishing between developed and developing countries. Every progressive nation has a national ICT policy and a practical implementation strategy to respond to the emerging global realities (Kpolovie, 2016g; 2014b).

23

The ITU Information and Communication Technology Global Development Index is a key indicator of national advancement (ITU, 2015). Global ICT Index by World Economic Forum (2015) is another commonly used indicator of national development for distinguishing between developed and developing nations. These two indexes both ranked African countries to be the worst in the word; and in Africa, Nigeria is ranked among the very worst five countries. Nigeria is specifically ranked 134th position with a very low score of 2.61 in ICT Development Index by ITU (2015).

This poor ranking of Nigeria is even much after the country developed its ICT policy. An ICT policy that aims at making each individual ICT adept is a fundamental tool for planning, managing, analyzing, and achieving sustainable development (Kpolovie, 2012; 2012c; 2014b). In her 'genuine efforts' at rapid development, Nigeria developed a National Policy for Information Technology with the intention of making Nigeria an Information Technology (IT) capable country in Africa and a key player in the information society by the year 2005, using IT as the engine for sustainable development and global competitiveness (Federal Ministry of Science and Technology, 2003, 3).

The policy was geared at ensuring that Nigeria uses IT for:
a.   Enhancement/development of education
b.   Wealth creation
c.   Eradication of poverty
d.   Creation of jobs
e.   Global competitiveness.

These broad goals could, however, be achieved only if, and when, each citizen is empowered with the requisite ICT skills in his or her area of specialization. The goals can therefore not be met unless the tertiary educational education system produces graduates who are skillful in the application of ICT in their areas of specializations.

As a step forward, the establishment of Federal Ministry of Science and Technology, the establishment of National Information Technology Development Agency (NITDA), and the creation of National Information Technology Development Fund (NITDEF) are steps that Nigeria has taken toward actualization of the National Policy for Information Technology. Also, the nation has and continues to attempt to produce a globally competitive high-quality labor force in IT-related disciplines with the following specific objectives (Federal Ministry of Science and Technology, 2003):

-developing a pool of IT engineers, scientists, technicians, and software developers
-increasing the availability of trained IT personnel
-providing careers opportunities in IT related areas

-providing requisite skills in the various aspects of IT
-developing Nigeria software to earn foreign exchange
-developing computer components.

Unfortunately, however, the year for the practical actualization of these objectives is not yet in sight. Until date, there is a virtual absence of IVT in Nigerian educational system (Kpolovie, 2016; 2016b; 2016a; 2016g). To this end, the need for improved incorporation of ICT in the Nigerian education system has remained inexorable.

The need to have a standardized and coordinated development and placement of ICT in education informed the development of the National Policy on ICT in Education in 2003. An approach that involved multiple sectors like the Federal Ministry of Education and its parastatals states ministries of Education, IT professional bodies, the private sector and Non-Governmental Organizations was adopted in the development of the Nigerian National Policy on Information Technology.

The policy defines a broad vision for ICT integration encompassing 'engaging, empowering, enriching, and enabling' ICT-furthered Education (FME, 2010a).
The policy objectives of ICT in Education are:
a.   To simplify the teaching and learning processes.
b.   To promote problem-solving, critical thinking and innovative skills.
c.   To promote life-long learning.
d.   To boost the numerous teaching/ learning strategies required to meet the needs of the population.
e.   To nurture research and development.
f.   To support active and efficient education administration.
g.   To enhance widespread access to information.
h.   To expand access to education and the array of instructional options and opportunities for any-where, any-time, any-place and any-path learning.
In order to implement the ICT in Education agenda, the policy thrust is to
a.   Inspire the development of ICT manpower required for ICT-furthered education.
b.   Create ICT infrastructure platform for education and
c.   Encourage development of a National Education and Research infrastructure,
d.   Ensure and encourage ICT Research and Development (R&D)
e.   Offer suitable legal, regulatory and security frameworks to ensure ICT Advanced Education
f.   Implement creative financing models for ICT in Education.

The Nigeria National Policy on Information Technology has not produced significant results due largely to five major categories of barriers to its implementation (Federal Ministry of Education, 2010):

-   Resistance to change
-   Inadequate funding
-   Lack of maintenance culture
-   Inadequate infrastructure
-   Inadequate skilled manpower

Institutions in Nigeria lack adequate ICT infrastructure to effectively tap into the opportunities offered by the cyberspace personal computers (PCS) are available in most higher institutions, but they are not readily accessible to students because of the low computer (PC): student ratio which is averagely put at about 1 to 40 (National Population Commission, 2014). In most cases, the basic software needed for practical works are not obtainable, and where they are available, they are not accessible because of the low ration. There is also a lack of computer aided interaction and other specific software to support some areas of teaching and research (Furr & Bacharach, 2014; Fraenkel & Wallen, 2003). It is true that internet connectivity is available in some intuitions in Nigeria, but in most cases, the bandwidth subscribed which determine the speed of access is too small to support any meaningful academic activity (Achimugu et al., 2010). Inadequate ICT technical personnel are a major problem in Nigerian tertiary institutions. The reason for this can be attributed to the worthwhile job opportunities available to ICT professionals outside the academics. The situation has made institutions depend on private commercial ventures to provide support for the few ICT facilities available. The support offered is in most cases are commercial and lack academic content. There is also the concern of faculty members not willing to take the 'soft' approach to teaching and learning rather; they stick to the old-fashioned 'hard' approach. Report from the Organization for Economic Corporation and Development gave reasons why faculties repel e–learning for example, that e-learning development, with its standardization aspects, might conflict to some extent with the specialized culture of academic based on autonomy and reward system often based on research, concern about intellectual property rights and shared rights between faculty, institutions and technologies (OECD, 2015; 2005).

There is also a major challenge which is funding, and this issue opposes the procurement and utilization of ICT in Nigeria universities education. Most institutions solely depend on their proprietor for funding and the bulk of such fund goes to servicing the overhead cost. Since no clear, viable business model has yet emerged for commercial provision of e-learning, and failures have been more frequent than success, (OECD, 2015; 2005), institutions are not eager to invest the minute fund available to them on an e-learning project. Association of African Universities in Onasanya.et al. (2010) acknowledged some obstacles in the introduction and

utilization of ICTs in African Universities. These include the following among others (Conwart, 2001; Drummond, Sheperis & Jones, 2016):

- Lack National Information and Communication Infrastructure policy (NICI)
- Internet traffic congestions or saturation due to limited bandwidth.
- Nonreliability of electricity supply.
- High Internet Service Providers (ISP) fees.
- Insufficient and irregular funding of ICT initiatives.
- Poor national telecommunication infrastructure (particularly inadequate telephone access)
- The absence of enabling environment, including highly regulated telecommunication industry, unsatisfactory performance of internet service providers and absence of incentives to promote innovation and risk taking.
- In some countries, the aggressive social climate and potential instability prevent opportunities of international collaboration and support.
- The absence of reliable electricity supply.
- Exorbitant importation costs of ICT equipment, often compounded by national tariff levels.
- Other are organization internal obstacles, human resources related obstacles.

Lecturers' adoption of ICT in teaching and research could be a direct function of Technology Acceptance Model (TAM). The Technology Acceptance Model (TAM) was developed by Fred Davis in (1986) as a modification or improvement of the theory of reasoned action (Banyard & Grayson, 2000; Davis, 1986; Colman, 2003) and expounded three years later by Davis, Bagozzi, and Warshaw (1989). The TAM lays emphasis on the psychological predisposition, social influences, and usability ease as well as utility. Hence, beliefs attitudes and intentions are key factors in the adoption of new technology. The model is aimed at predicting individual's acceptability of an information system. TAM suggests that when users are presented with a new technology, some factors influence their choice or decision towards the technology (Alamieyeseigha & Kpolovie, 2013) regarding how and when they will use it (Cowart, 2001). The acceptability of an information system greatly depends on two main factors (Davis, Bagozzi, and Warshaw, 1989, 993):
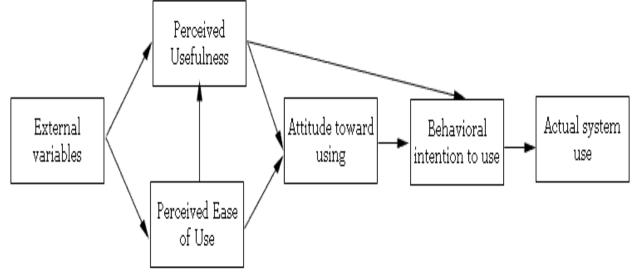
 i.   Perceived usefulness
ii.   Perceived ease of use.
Perceived ease of use, on the other hand, refers to the degree to which an individual believes that the use of a system or a particular technology would be free from unnecessary effort. Perceived usefulness according to Davis (1986) is the extent to which an individual believes that using a particular technology would improve his or her job performance.

As shown in the theory of reasoned action, the Technology Acceptance Model (TAM) holds that the use of an information system is greatly influenced by behavioral intentions which on the

27

other hand is determined by the person's attitude towards the use of the system and also his perception of its usefulness. Therefore, attitude is not the only predictor of an individual's choice and use of a technology system but also its usefulness to the individual (Kpolovie, 2016b; 2012b). Therefore, even if an employee does not welcome an information system, the likelihood that he will use it is high if he perceives that using the system will distinctly ease his job and improve his performance or productivity at work (Kpolovie, 2012a). The Technology Acceptance Model suggests a direct link between perceived usefulness and perceived ease of use (Kpolovie & Iderima, 2016; 2016b; 2013). The Technology Acceptance Model that illustrates functionality of the model can be presented diagrammatically thus:

Source: Davis, Bagozzi, and Warshaw (1989, 993). *"User acceptance of computer technology: A comparison of two theoretical models," Management Science, **35**: 982–1003, doi:10.1287/mnsc.35.8.982*

According to Davis (1986), perceived ease of use also impacts in a significant way the attitude of an individual through two main mechanisms: Self-efficacy and instrumentality. Self-efficacy is a concept established by Bandura (1982) which explains that the more a system is easy to use, the greater should be the user's sense of efficacy. Furthermore, a tool that is easy to use will make the user feel that he has control over what he is doing. Efficacy is one of the key factors underlying intrinsic motivation and it is what demonstrates here the direct link between perceived ease of use and attitude. Perceived ease of use can also back in an instrumental way in improving an individual's performance. Because the user will have to deploy less efforts with a tool that is easy to use, he will be able to spare efforts to accomplish other tasks. It is, however, exciting to note that the research presented by Davis (1989) to authenticate his model, establishes that the link between the intention to use an information system and perceived usefulness is

28

stronger than perceived ease of use. According to this model, we can, therefore, expect that the factor which influences a user the most, is the perceived usefulness of a tool.

The present study will assess the participants' attitude towards various aspects of ICTs usage (Affective, Perceived usefulness, perceived ease of use, and behavioral intention). Affective refers to feelings towards ICTs, perceived usefulness refers to individual beliefs about the usefulness of computer in teaching and research, perceived ease of use refers to perceived comfort level or difficulty of using ICTs which will be measured by ICT competence; and behavior refers to behavioral intentions and actions. Lecturers' attitude towards ICT adoption in this study will also be investigated regarding gender, area of specialization, type of institution, and years of lecturing experience.

There are two lines of understanding in respect of attitude-behavior relations and what makes attitude predict behavior. One line, *attitude accessibility*, proposes that attitudes influence behavior when actors activate them from memory and that these attitudes are more expected to guide behavior when they are easy to retrieve. The other line of research (called *attitude stability* research) proceeds from the belief that attitudes influence behavior when they are so steady that actors can reconstruct them almost without thinking. Conditions that strengthen the attitude-behavior relation in both approaches are direct experience, motivation to think about an object or issue, relevant and one-sided information, believing that one's attitudes are correct, and easily recollected attitudes. Other situations that influence attitude-behavior relations are if attitudes are general or specific regarding a particular behavior. Specific attitudes to a particular behavior improve attitude-behavior relations because the attitude responds closely to the predicted behavior. On the other hand, when the attitude is general and the behavior specific there is no close correspondence between attitude and behavior.

Research in the area of teachers' use of ICT in education sees attitudes as having either a direct or indirect influence on a teachers' use of technology in classrooms. The direct influence of attitudes can be categorized into two groups: *attitudes to technology* and *attitudes to ICT use* in education. One example where attitudes have an indirect influence on ICT use in education is given in the Cox, Preston and Cox, (1999) study where attitudes seemed to influence teachers' motivations to use ICT. Teachers' motivation is, according to Cox et al. (1999), a factor with a direct influence. Another example is attitudes as a factor that will promote innovative use of ICT (Joe, Kpolovie, Osonwa & Iderima, 2014; Kpolovie, Joe & Okoto, 2014; Kpolovie, 2002; 2002a).

Positive attitudes to ICTs, and their use in education are often proposed to be enabling factors, and negative attitudes are disabling factors. However, positive attitudes to ICT use can be more or less specific to ICT in school, ranging from a general positive attitude to ICT in education to a more specific attitude to using ICT in daily work with students in classrooms. This distinction seems to be lacking in studies linking attitudes to computer use in teaching. Furthermore, the

experience of ICT use seems to be a link between the two theories presented above in that both self-efficacy and attitudes to ICT use are positively related to experience. In this sense, it can be argued that familiarity with technology use makes people regard ICT use more positively, which also results in a greater feeling of self-efficacy (Papastergiou, 2010).

METHODOLOGY

Ex post facto research method was employed for this study. Ex post facto research method is suitable for investigations that done retrospectively to identify possible cause-and-effect relations between the variables under study through observation of existing conditions and inquisitively searching back historically for the plausible causal factors (Kpolovie 2016; 2016g). Ex post facto research is a methodological approach for eliciting probable antecedents of events that have occurred already and which cannot be subjected to the direct, rigorous manipulation and control by the researcher. Ex post facto research is used in situations that "ethical consideration may prevent a researcher to use experimentation as a method of investigation… Respect for living things prevents an investigator from inflicting unnecessary pain, hardship, or harm on others, or from interfering in any way with the normal growth and development of an individual" (Koul, 2009, 117). The investigator is merely concerned with the identification of factors or variables that seem to have caused or been associated with the behavior, occurrences or conditions under empirical scrutiny in ex post facto research (Best & Kahn, 2007; Gay, 2010). Ex post facto design merely collects and analyzes data from some variables which are already in place, without manipulating any of them, to find out how some of them influence, or are related to other variables.

Ex post facto research takes groups that are already different naturally or otherwise, and retrospectively obtains and analyzes data on some variables in the groups to determine whether they are causal factors for the difference in the groups. In some other cases, ex post facto study is used for retrospective examination or exploration of the effects of an event that occurred naturally on a subsequent outcome for the plausible establishment of a causal link between them. In situations of this type, the independent variables have already occurred, and the investigation begins with observation and analysis of a dependent variable in retrospect for its possible relationship to, and effects on the dependent variable (Graziano & Raulin, 2007; Groth-Marnat & Davis, 2014).

Ex post facto research is more or less the direct opposite or inverse form of experimental research. In experimental research, the investigator creates, controls or manipulates difference between or among randomized groups with treatments; and compares subjects' performance in the groups on one or more independent variables solely for determination of the effects of the manipulation on the dependent variable. In ex post facto research, on the contrary, the investigator seeks to empirically establish the causes or consequences of already existing

difference between or among non-randomized groups of individuals. That is, ex post facto research studies retrospectively both the effects and causes of an event or a phenomenon that has already occurred or taken place in an uncontrolled manner. Group difference variables often investigated with ex post facto research are either categorical variables that cannot be manipulated such as sex (male and female), school ownership (federal or state, public or private), socioeconomic background (low, medium and high), as well as continuous variable like intelligence; or variables that might be manipulated but for ethical reasons were not manipulated such as alternative baby-diets, different infertility drugs and different secondary school curricula.

Every research method has certain characteristics features that make it unique from other methods, and which simultaneously make it similar to other methods for it to qualify as a type of research. Ex post facto research is characterized chiefly by *retrospectivity, lack of control, compete flexibility* and *post hoc ergo propter fallacy* (Kpolovie, 2016; 2010).

i.   *Retrospectivity*

Ex post facto research empirically investigates plausible cause-and-effect as well as causal-comparative associations of events that have taken place in the past. By systematically collecting and analyzing data on situations or circumstances that have already occurred and scrutinizing the same for determination of possible tentative causal links and causal comparatives between or among variables of interest, ex post facto research is said to be retrospectively dealing with the situations.

ii.   *Lack of Control*

Since the cause and effect scenario that ex post facto is concerned with are events that have already occurred, the researcher makes no attempt at controlling and manipulating the variables in question. For this reason, there is a very high probability that factors or variables other than the independent variables under investigation were the ones that are responsible for any association between the dependent and independent variables. Lack of control here also refers to the modus operandi of ex post facto research that does not allow for the random assignment of subjects into groups and random assignment of treatment conditions into groups or vice versa. It is only under stringent control and manipulation of variables as well as perfect randomization that one can conclusively and correctly assert that one variable was caused by another. But since this is not possible with ex post facto research, findings of such investigation can never be said to be truly indicative of cause-and-effect relationships. It is not even possible to say with certainty which of variables X and Y is suffering the effect of the other. It is only in a true experimental study that causal relationships can unquestionably or indisputably be established. This impossibility of having control over the independent variables that influence the dependent variable in causal effect design scenario of ex post facto research as well as the impossibility of exerting control over all extraneous variables that influenced the observed differences between dependent variables in the case of causal-comparative design of ex post facto research is the greatest limitation of this research method. For any ex post facto investigation to be successful,

31

concerted efforts must be made to reduce the influence of extraneous variables and improve the sampling process as indicated in the next section.

iii.   Complete Flexibility

Ex post facto research is totally flexible as it can correctly accept all sorts of hypotheses, even contradictory ones. Also, a variety of interpretations is possible of results from an ex post facto study. This is because, with it, the researcher starts with certain data such as differences in groups and postulates a variety of interpretations that are consistent with the data.

iv.   *Post hoc ergo propter fallacy*

This refers to a highly possible fallacy that could be very easily made with ex post facto research by merely establishing a causal relationship on nothing more substantial than the premises that any related event occurring before the phenomenon under investigation is assumed to be the cause. Simply put, it is highly susceptible to self-fulfilling prophecy fallacy of the investigator. That is, if the researcher hypothesized that differences in variable X are caused by conditions of variable Y, and when data collected and analyzed showed a significant relationship between variables X and Y; the researcher, in many if not most cases, tends to conclude erroneously that the hypothesized relation has been confirmed. Such conclusion is fallacious because the reverse might have most probably been the case; or most likely, the relationship between variables X and Y was caused completely by a third variable which could be a single or combination of extraneous variables.

There is two ex post facto research designs. An investigator can use either of the two designs, depending on the nature of the problem being investigated and the purpose of the study. He could also use both of the designs on the basis of how extensive the study is. The two types of design are: co-*related or causal ex post facto research design;* and *criterion group or causal-comparative ex post facto research design.* This investigation adopted the causal-comparative (also referred to as criterion group) ex post facto design. The causal-comparative ex post facto design is used for discovery of possible causes of a phenomenon that is under investigation through empirical comparison of a group of subjects who possess the trait, attribute, construct, characteristic or variable of interest with a similar or comparable group of subjects who do not possess the trait. In this type of study, groups, differentiated regarding some independent variables, are compared on a given variable for the retrospective partial causal link as the researcher only attempts to link some already existing effect or observation to some variable(s) as causative agents.

There are two different ways that causal-comparative design can be done. a)
Effect-to-cause causal-comparative ex post facto design. In the first type or circumstance, the researcher investigates two existing groups that are very different in some ways to elicit the factor or factors that are responsible for the difference between the two groups. This is done by hypothesizing on the possible causes of the difference, collecting antecedent or retrospective data on the hypothesized causes and subjecting the data to suitable statistical analysis to show

whether or not a significant difference exists in the postulated causal factor. In this way, the investigation is said to be an *effect-to-cause* kind of causal-comparative design (Cohen and Manion, 1989; Kpolovie, 2016). It is this effect-to-cause type of causal-comparative ex post facto research that was employed in this study.

The second type, *cause-to-effect* causal-comparative ex post facto design, was also adopted in this study. In this kind, the researcher hypothesizes the independent variable, collects relevant data and compares two groups, one of which is a retrospective experimental group and the other, a retrospective control group. While the retrospective experimental group was exposed to treatment with the independent variable, the retrospective control group is identical to the experimental group but was not exposed to the experimental treatment (administration of the independent variable). Causal-comparative ex post facto research design in which this kind of comparison is done is referred to as *cause-to-effect* (Cohen and Manion, 1989; Cohen, 2008; Cohen, Manion & Morrison, 2008; Cohen, Swerdlik & Sturman, 2013).

Causal-comparative ex post facto research design can be presented diagrammatically as follows.

Group	Independent variable	Dependent variable
E	X	O_1
C		O_2

The dashed line denotes that the comparison groups, experimental and control, are not equated with randomization (random assignment of subjects and treatment conditions into groups). Worthy of reiteration is the fact that ex post facto research designs are different from pure experimental designs. While the independent variable in ex post facto research is not manipulated or controlled by the researcher (because it has already occurred in the past), the researcher in experimental study manipulates and controls the independent variable for its effect (and nothing else) to be observed in the dependent variable that is itself not allowed to be influenced by extraneous variables. Furthermore, randomization is done in the experimental researcher, but there is no possibility of randomization in ex post facto research.

The population for this study consists of all lecturers in   the University of Port Harcourt (1503) (Source: Office of the Registrar, and staff statistics and records office University of Port Harcourt) and Rivers State University of Science and Technology (496) (Source: Office of the Registrar, Rivers State University of Science and Technology). That is, a total of 1999 academic staff constituted the population of this investigation.

A sample of 400 academic staff was drawn, using proportional stratified sampling technique (Kpolovie, 2011; 2016g), for this study. Krejcie and Morgan's table (Krejcie & Morgan, 1970) was used to ascertain the adequacy of the sample size. Application of Taro Yamen's formula as

given in Baridam (2001) and Isangedighi et al. (2004) equally confirmed the adequacy of the sample size of this study.

The instrument for data collection for this study was questionnaire known as Lecturers' Attitude Towards Information and Communications Adoption Questionnaire (LATICTAQ). The instrument had four sections. Section A was meant to elicit demographic information (gender, years of teaching experience, the area of specialization and type of institution) while section B was designed to elicit a response on the attitude (affective, cognitive and behavioral domains) of Lecturers towards ICT adoption. The attitude instrument contained 20 items made up of some positively and negatively keyed items. This instrument was scored 20 for the minimum and 80 for the maximum. Section C was to determine the levels of competency in various ICT facilities. Section D dealt with the accessibility of ICT. The competency and accessibility sections contained 22 and 13 items respectively and were scored 22 for the minimum, 88 for the maximum and 13 for the minimum and 52 for the maximum, respectively. Hence a total of fifty-five (55) items instrument of a four-point Likert scale type of response was used for this study (McQueen & Knussen, 2006; Kpolovie, 2014; Best, 1981; Breakwell, Hammond & Fife-Schaw, 2001; Blaxer, Hughes & Tight, 2009).

The validity of the LATICTAQ (an instrument for data collection of this study) was established with Factor Analysis. Construct validity via subtest-total correlation ranged from .84 and .77 through .73 to .69, respectively, for sections A, B, C, and D of the instrument. With Cronbach Alpha method, the reliability of the instrument was found to be .86, .67, .76, and .51 for the four respective sections or subscales. The instrument for the study was administered to the respondents through the direct delivery method by the researchers and their trained assistants to ensure complete response and collection on the spot.

While the research questions were answered with descriptive statistics (mean and standard deviation), the hypotheses were tested at .05 alpha with independent samples t-test and analysis of variance. Specifically, the use of independent samples t-test was for testing hypotheses 1 and 4, while hypotheses 2 and 3 were tested using one-way ANOVA.

RESULTS PRESENTATION

Research Question 1: What is the attitude of male and female lecturers towards ICT adoption in teaching and research in Rivers state?

Hypotheses 1: There is no significance difference between male and female lecturers' attitude towards ICT adoption in teaching and research in Rivers State.

34

Table4.2: Independence samples t-test showing the attitude of male and female lecturers towards ICT adoption in teaching and research in River state.

	N	Mean	Std. Deviation	Df	T	Sig
Gender						
Male	251	57.42	19.68	398	1.641	.394
Female	149	54.15	18.53			

The results in Table 4.1 shows that male lecturers have a mean of 57.42 (N= 251) and SD of 19.68, while their counterpart females has a mean of 54.15 (N=149) and SD of 18.53. From the results, the mean and standard scores of the males and females do not seem to differ much. A further and critical look at the same table showed that the t- calculated value of 1.641 obtained was not statistically significant at 0.05 alpha (P= .394>0.05). Based on this confirmation, the first hypothesis of no significant difference between male and female lecturers' attitude towards ICT adoption in teaching and research in Rivers State is retained.

Research Question 2: What is the attitude of Science, Arts, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers towards the adoption of ICT in teaching and research in Rivers state?

Table 4.2: Descriptive statistics showing the attitude of Science, Arts, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers towards the adoption of ICT in teaching and research in Rivers State

	N	Mean	Std.D
Science	**103**	**54.72**	**20.00**
Arts	**45**	**62.67**	**20.03**
Education	**43**	**57.49**	**19.07**
Social Sci.	**22**	**57.18**	**22.75**
Management	**30**	**59.47**	**15.77**
Health Sci.	**89**	**55.42**	**18.79**
Engineering	**68**	**52.65**	**18.26**
Total	**400**	**56.21**	**19.30**

Table 4.2 has shown the attitude of lecturers based on their area of specialization on the adoption of ICT towards teaching and research in University in Rivers State. From the Table, science, arts, education, social sciences, management sciences, health sciences and engineering lecturers have a mean scores of 54.72, 62.67, 57.49, 57.18, 59.47, 55.42 and 52.65, respectively; and their standard deviations are of 20.00, 20.03, 19.07, 22.75, 15.77, 18.79, and 18.26, respectively.

Hypotheses 2: There is no significant difference between the attitude of Science, Arts, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers towards the adoption of ICT in teaching and research in Rivers state.
The hypothesis testing with ANOVA and multiple comparisons are shown in Tables 4.3 and 4.4.
Table 4.3: ANOVA Showing the significance difference of the attitude of Science, Arts, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers towards the adoption of ICT in teaching and research in Rivers state

ANOVA

	Sum of Squares	Df	Mean Square	F	Sig.
Between Groups	3433.724	6	572.287	1.549	.161
Within Groups	145211.466	393	369.495		
Total	148645.190	399			

Table 4.3 revealed the Analysis of the Variance of the attitude of Science, Arts, Education, Social Sciences, Management Sciences, Health Sciences and Engineering lecturers' attitude towards the adoption of ICT in teaching and research in Rivers State. A calculated F value of 1.549 was realized at the probability level of .161. Since the probability level of .161 was greater than the chosen alpha of .05 (i.e. .161 > .05) the null hypothesis is retained. This implies that there is no significant difference between the attitude of lecturers based on their area of specialization towards the adoption of ICT in teaching and research in Rivers State.

Table 4.4: Multiple comparisons of the attitude of lecturers based on area of specialization

Area of Specialization	(J) Area of specialization	Mean Difference (I-J)	Std. Error	Sig.
	Arts	-7.94822	3.43487	.500
	Education	-2.76993	3.49002	.996
Science	Social sciences	-2.46337	4.51470	1.000
	Management	-4.74822	3.98796	.964
	Health sciences	-.69728	2.78190	1.000
	Engineering	2.07139	3.00351	.998
	Science	7.94822	3.43487	.500
	Education	5.17829	4.09926	.953
Arts	Social science	5.48485	5.00062	.977
	Management	3.20000	4.53073	.998
	Health sciences	7.25094	3.51605	.643
	Engineering	10.01961	3.69388	.292
	Science	2.76993	3.49002	.996
	Arts	-5.17829	4.09926	.953
Education	Social.science	.30655	5.03866	1.000
	Management	-1.97829	4.57268	1.000
	Health sciences	2.07264	3.56995	.999
	Engineering	4.84131	3.74522	.947
	Science	2.46337	4.51470	1.000
	Arts	-5.48485	5.00062	.977
Social Sciences	Education	-.30655	5.03866	1.000
	Management	-2.28485	5.39553	1.000
	Health Sciences	1.76609	4.57677	1.000
	Engineering	4.53476	4.71476	.988
	Science	4.74822	3.98796	.964
	Arts	-3.20000	4.53073	.998
Management	Education	1.97829	4.57268	1.000
	Social science	2.28485	5.39553	1.000
	Health sciences	4.05094	4.05809	.986
	Engineering	6.81961	4.21310	.854
	Science	.69728	2.78190	1.000
	Arts	-7.25094	3.51605	.643
Health sciences	Education	-2.07264	3.56995	.999
	Social science	-1.76609	4.57677	1.000
	Management	-4.05094	4.05809	.986
	Engineering	2.76867	3.09603	.992
	Science	-2.07139	3.00351	.998
	Arts	-10.01961	3.69388	.292
Engineering	Education	-4.84131	3.74522	.947
	Social science	-4.53476	4.71476	.988
	Management	-6.81961	4.21310	.854
	Health sciences	-2.76867	3.09603	.992

The Table 4.4 shows how the attitude of lecturers based on the area of specialization differ. From the Table, there is no significant difference. For example, between science and arts (p= .500), science and education (p=996), science and management (p=.964), science and health sciences (1.000), science and engineering (.998). Hence, there is no significant difference between the

38

attitude of lecturers towards ICT adoption in teaching and research in the areas of specialization investigated in this study.

Research Question 3: What is the level of competency of highly experienced, moderately experienced and less experienced lecturers towards the adoption of ICT in teaching and research?

Hypothesis 3: There is no significant difference between highly experienced, moderately experienced and less experienced lecturers' level of competency in the use of ICTs in teaching and research in Rivers state.

Table 4. 5: Descriptive statistics showing the level competency of highly, moderately and less experienced lecturers towards the adoption of ICT in teaching and research in Rivers state

	N	Mean	Std. Deviation
Highly experience	168	43.48	18.33
Moderately experience	144	58.72	18.51
Less experience	88	64.20	15.50

The first table contains the descriptive statistics of the variables. From the table, highly experienced lecturers, moderately experienced and less experienced lecturers have mean scores of 43.48, 58.72, 64.20 and standard deviation scores 18.33, 18.51, 15.50 respectively. A critical look at the table indicates that less experienced lecturers have the highest mean score. This implies that the less experienced lecturers are more competent in the use of ICT facilities.

Table 4.6. ANOVA Showing the significance difference of highly experienced, moderately experienced and less experienced lecturers   level of competency in the use of ICTs in teaching and research in Rivers state

	Sum of Squares	df	Mean Square	F	Sig.
Between Groups	**30880.938**	**2**	**15440.469**	**48. 619**	**.000**
Within Groups	**126078.7020**	**397**	**317.579**		
Total	**156959.40**	**399**			

Table 4.6 has shown Analysis of Variance of highly experienced, moderately experienced and less experienced lecturers' levels of competency in the use of ICTs in teaching and research in Rivers state. A calculated F value of 48.619 is got at the probability level of .000. Since .000 was less than the chosen probability level of .05 (i.e. .000 <.05), the third null hypothesis is rejected. This implies that there is a significant difference between highly experienced, moderately experienced and less experienced lecturers' levels of competency in the use of ICTs in teaching and research in Federal and state-owned universities in Rivers State.

Table 4.7: Multiple comparisons of highly experienced, moderately experienced and less experienced lecturers   level of competency in the use of ICTs in teaching and research in Rivers state

(I) Years.of.teaching.experience	(J) Years.of.teaching.experience	Mean Difference (I-J)	Std. Error	Sig.	95% Confidence Interval	
					Lower Bound	Upper Bound
Highly experienced	Moderately experienced	-15.24702[*]	2.02380	.000	-20.2195	-10.2745
	Less experienced	-20.72240[*]	2.34504	.000	-26.4842	-14.9606
Moderately experienced	Highly experienced	15.24702[*]	2.02380	.000	10.2745	20.2195
	Less experienced	-5.47538	2.41128	.077	-11.3999	.4492
Less experienced	Highly experienced	20.72240[*]	2.34504	.000	14.9606	26.4842
	Moderately experienced	5.47538	2.41128	.077	-.4492	11.3999

The Table 4.7 shows the level of competency of lecturers based on years of teaching experience differs from one another. From the Table, there is a significant difference between the level of competency of highly experienced and moderately experienced (p= .000; highly experienced and less experienced (p=.000); and there is no significant difference between moderately experienced and less experienced lecturers' levels of competency in the use of ICTs in teaching and research in Rivers State (p= .077). This therefore implies that lecturers who are moderately experienced and less experienced are more competent in the use of ICTs in teaching and research than their highly experienced counterparts.

Research Question 4: How accessible are ICT facilities in teaching and research in state and federal universities Rivers State?

Hypotheses 4: There is no significance difference between accessibility of ICT facilities in a state (UST) and a federal university (UNIPORT) in teaching and research in Rivers state.

Table 4.8: Independence t-test showing the accessibility of ICT facilities in a state (UST) and a federal university (UNIPORT) in teaching and research in Rivers state.

	Institution	N	Mean	Std. Deviation	Df	T	Sig
Accessibility	UNIPORT	316	35.68	10.57	398	7.009	.000
	UST	84	26.67	10.06			

The results in Table 4.9 showed that the University of Port Harcourt had a mean of 35.68 (N= 316) and SD of 10.57while Rivers State University of Science and Technology had a mean of 26.67 (N=84) and SD of 10.06. A further and critical look at the same table showed that the t-calculated value of 7.009 obtained was statistically significant at 0.05 level of probability (P=

41

.000<0.05). Based on this confirmation, therefore, the hypothesis of no significant difference between ICT accessibility in a state and a federal university in teaching and research in Rivers State is rejected.

In summary, the findings of this research have shown that:
1.   The attitude of male and female lecturers towards the adoption of ICT in teaching and research in Rivers State do not significantly differ.
2.   University lecturers' areas of specialization do not have any significant influence on their attitude towards the adoption of ICT in teaching and research.
3.   There is a significant difference between the level of competency of lecturers who are highly experienced, moderately experienced, and less experienced towards the adoption of ICT in teaching and research. The last two categories of lecturers have a significantly better attitude towards adoption of ICT in teaching and research.
4.   There is a significant difference between the Federal university (University of Port Harcourt) and state university (Rivers State University of Science and Technology) in their accessibility of ICT facilities in teaching and research.

DISCUSSION OF FINDINGS

Attitude of male and female towards ICT adoption
In Table 4.2, it was shown that male had a mean of 57.42 (N= 251) and SD of 19.68, while female had a mean of 54.15 (N=149) and SD of 18.53. From the result, the mean and standard deviation scores of the males are higher than their female counterparts. It also revealed that the male has a positive attitude towards the adoption of ICT in teaching and research than the females, though the difference is not significant statistically. A further and critical look at the same table showed that the t- calculated value of 1.641 obtained was not significant at 0.05 level of probability (P═ .394>0.05). Based on this confirmation, therefore, the hypothesis of no significant difference between male and female lecturers' attitude towards ICT adoption in teaching and research was accepted. Kpolovie and Iderima (2013), Kumar et al. (2008) and Sang et al. (2009), and Onasanya, et al. (2012) also found that gender has no significant effect on the attitude of lecturers towards integration of ICT into teaching and research in tertiary institutions. The finding also supports Brosnan (1998) who argues that males indicated a more positive attitude toward ICT than females do, but not significantly. The findings of Graff (2003) that females were significantly more averse to utilize ICT and were less positive about utilizing ICT than males do; were not corroborated by the results of the current investigation that male and female lecturers do not significantly differ in their attitude towards adoption of ICT in teaching and research.

The finding of the current study that there is no significant gender difference in the attitude of male and female lecturers towards the adoption of ICT in teaching and research corroborate the

major result of Yusuf and Balogun (2011). Yusuf and Balogun. (2011), investigated Student-Teachers' competence and Attitude towards Information and Communication Technology in the University of Ilorin. Gender influence on participants' ICT competence and attitude was equally studied in their work. Participants were 382 student-teachers (181 males and 201 females) from Faculty of Education in the University of Ilorin. The data collected through questionnaire were analyzed using percentages, means, and chi-square statistics. Findings revealed that majority of the students-teachers have a positive attitude towards the use of ICT, and they are competent in the use of few basic tools. Overall, no significant difference was established between male and female student-teachers' attitude and use of ICT. The implication is that the student teachers lacked the necessary competence in the full integration of ICT in the curriculum. This underscores the need to improve the ICT content of teachers' education programs in universities in Nigeria.

Brosnan (1998) concluded that males showed more positive attitudes toward ICT than females do. In the same context, Graff (2003) declared that females were less likely to use ICT and were less confident in using ICT than males do. Moreover, Palaigeorgiou et al. in Mohamed, E. (2012) also confirmed that both males and females had similar engagement with ICT and held concerns for the future effects of continuous computer use, but females were more concerned and judged less positively the consequences of ICT in personal and social life. Papaioannou and Charalambous (2011) explored the impact of gender on the attitudes toward ICT. The study found that both male and female hold positive attitudes toward ICT with males having stronger positive attitudes than their female colleagues. Also, Ainley   Enger in Mohamed (2012) discovered that regarding gender, males have more positive attitudes towards ICT (Ziliak & McCloskey, 2008).

Areas of specialization and ICT adoption
From the ANOVA table in Table 4.4, there was no significant difference of attitude of lecturers based on their area of specialization on the adoption of ICT towards teaching and research in University in Rivers state. This is because the since F (df. 6,393) = 1.549, p = .161) and therefore, the null hypothesis is accepted. Also in Table 4.5, it was shown that lecturer's area of specialization does not significantly differ with their attitude on the adoption of ICT. This was shown as the table indicated that there is no significant difference between science and arts (p= .500), science and education (p=996), science and management (p=.964), science and health sciences (1.000), science and engineering (.998). Hence, there is no significant difference between the attitude of lecturers towards ICT adoption in teaching and research in all areas of specialization. This finding was in accordance with those of Akpan et al. (2011). The second finding of the current study also support the results of Ajibade, Oloyede, Adeleke and Awopetu, (2012). In their study, they found that lecturers' faculty, sex, years of teaching experience, academic status and past introduction to preparing on teachers' disposition to and supposition on pedagogical aptitudes preparing does not have any significant difference in their attitude towards

43

the adoption of ICT in teaching and research. The current finding on the area of specialization is contrary to what Onasanya et al. (2012) found that science-oriented lecturers' attitude towards integration in a tertiary institution is higher than other non-science oriented lecturers.

Lecturers Competency and ICT Adoption
From the ANOVA table 4.7, there was a statistically significant difference between highly experienced, moderately experienced and less experienced lecturers' level of competency in the use of ICTs in teaching and research in University in Rivers state. Since F (2,397) =p=0.000 and therefore, the null hypothesis which states that there is no significant difference between highly experienced, moderately experienced and less experienced lecturers level of competency in the use of ICTs in teaching and research in Rivers state is rejected and the alternative accepted. Also in table4.8, there was a significant difference between highly experienced and moderately experienced (p= 0.00), Highly experienced and less experienced (p=0.00) and there was no significant difference between moderately experienced and less experienced lecturers' level of competency in the use of ICTs in teaching and research in Rivers state (p= .077). This therefore implies that lecturers who are less experienced are more competent towards the adoption of ICT in teaching and research.

Adams (2002) reasoned that more youthful female lecturers with less teaching experience more promptly incorporate innovation into teaching rehearses. Berner (2002) noted that lecturers' ICT competency is a noteworthy indicator of their attitude towards ICTs. Akpan (2014) also opined that the level of ICT competence of teachers essentially improved their employment viability. The result that lecturers with less teaching experience have significantly better attitude towards adoption of ICT in teaching and research than their counterpart lecturers with greater teaching experience is in line with findings of Ololube, Amaele, Kpolovie, and Egbezor (2012) on the issues of digital natives and tourists' level of ICT usage between university students and faculty members in a developing economy. Results indicated that the students were overwhelmingly more ICT literate than the lecturers. Replicating the investigation with another population, sample, and at a different geopolitical region, Ololube, Kpolovie, Amanchukwu, and Briggs (2013) in a work titled "digital natives and digital immigrants: a study of Information Technology and Information Systems usage between students and faculty of Nigerian universities." The investigation revealed that the students are significantly much better than the lecturers in the use of ICT facilities. The lecturers were weaker in ICT adoption vis-à-vis their students just as the current study has conclusively shown that younger and less experienced lecturers have an incomparably better attitude towards ICT adoption than older and more experienced lecturers in both federal and state universities in Nigeria.

Olusesan and Adu (2014) investigated information and communication technology (ICT) accessibility and utilization for effective teaching of biological science in secondary schools in Ibadan-north Local Government Area. A 20 item instrument (ICTFAQ) and (ICTFUQ) were

44

adopted for this study. The study sampled 72 biological science teachers in selected secondary schools in Ibadan-north, Oyo State. The descriptive statistics was adopted in analyzing the data collected for this study, while the generated hypotheses were tested at 0.05 level of significance, using t-test. Hence, the results revealed that ICT facilities were not available and accessed by teachers in secondary schools in Ibadan North. In addition, it was revealed that biological science teachers in these schools do not also have the proper skills required to utilize ICT for effective teaching of the subject.

Accessibility and ICT Adoption
The results in this regard showed that the University of Port Harcourt had a mean of 35.68 (N= 316) and SD of 10.57, while Rivers State University of Science and Technology had a mean of 26.67 (N=84) and SD of 10.06. A further and critical look at the same table showed that the t-calculated value of 7.009 obtained was statistically significant at 0.05 level of probability (P= .000<0.05). Based on this confirmation, therefore, the hypothesis of no significant difference between ICT accessibility in a state and a federal university in teaching and research in Rivers state is rejected. This evidence supports the work of Abdulkai (2004) who found a positive connection between educators' attitude towards ICT and proprietorship or school ownership and availability to class ICTs, the level of accessibility and number of ICT areas in the school. He also inferred that there was a noteworthy relationship between the proximity of ICTs and attitude towards ICTs.

Akpan (2014) investigated the influence of ICT competence on lecturers' Job Efficacy in two Nigerian universities. Two hypotheses were formulated to guide the study. The sample of the study consisted of 500 university teachers randomly sampled from a population of 1,795 teachers. Data for the study were collected using ICT Competence and Job Efficacy Questionnaire (ICTCJEQ). The data were analyzed using Chi-square and One-way Analysis of Variance (ANOVA) statistical techniques. The results of the study revealed that male and female lecturers did not differ significantly in their level of ICT competence. Lecturers with high ICT competence were found to be more efficacious in classroom instruction, research/publication, communication and recordkeeping than those with moderate and low ICT competence. The findings of this study revealed that the level of ICT competence of lecturers significantly enhanced their job efficacy. Premised on these findings, it was recommended that lecturers should be well motivated to develop their ICT competence as this has been found to improve job efficacy for high productivity. University management should encourage lecturers to participate in ICT training programs and ICT facilities should be provided in lecturers' offices to enhance their job efficacy.

Generally, the findings of this study have implication for university administrators, National University Commission (NUC), government and lecturers. The findings of this study revealed that less experienced lecturers and moderately experienced lecturers are more competent in the

use of ICT facilities than their senior colleagues. This implies that there is a need for the introduction of programs or courses to help highly experienced lecturers update their ICT skills. Finally, it was observed from the findings of this study that gender, and lecturers' areas of specialization do not significantly influence their attitude towards ICT adoption in teaching and research in University.

The recommendations are as follows:
1.   The university education curriculum should be reviewed to reflect more practical courses in ICT for pre-service and in-service lecturers.
2.   National Universities Commission in collaboration with the government should provide the necessary ICT facilities and equipment in the universities as well as monitoring and assessment of its usage.
3.   University management should encourage lecturers to participate in ICT training programs, lecturers especially highly experienced should be well motivated to develop their ICT competence.
4.   The state government needs to do much more in providing its university with ICT facilities.

Based on the findings of this study, it was concluded that lecturers' personal characteristics such as gender and area of specialization are not predictors of lecturers' attitude towards ICT adoption in teaching and research in universities in federal and state-owned universities in Rivers State. Years of teaching experience affects the level of ICT competence; ICT accessibility varies between federal and state-owned universities in favor of the former.

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