Investigating Lecturers Perception of Barriers to Effective Utilization of Information and Communication Technology in Colleges of Education in North Eastern Nigeria

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Abstract

In this research proposal, we have outlined the need for research and development initiative in the area of Utilization of Information and Communication Technology in Education. This need is consistent with growing concern by all stakeholders in education that the condition of ICT in teaching and learning is internationally unacceptable. However, despite concerted efforts by the FGN/MDGs and other non-governmental organizations through re-training and training the trainers of ICT and its uses by teachers in education, we have not seen significant improvement in the area of Information and Communication Technology teaching and learning, by our teachers in Colleges of Education. This lack of noticeable improvement might be due to the lack of clear understanding of the current status of our teachers' knowledge and Technological Pedagogical knowledge content on one hand, and the lack of access and technological support by our institutions on the other hand before designing such interventions. Therefore, the aim of this research project is to collect and analyze baseline data that would guide us and others in the subsequent design of interventions for improving the role playing ground of lecturers on the use of ICT facilities in the teaching process in Colleges of Education of the North Eastern States

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The duality of this project consisting of research and development is both innovative and responsive to the realities of what is on the ground as well as international trends. In line with this aim, we identified two areas of focus at this stage: (i) Lecturers barriers, and (ii) institutional barriers. Lecturers barriers will be seen in two ways: firstly, the technological knowledge of the lecturers, secondly the technological pedagogical knowledge of the lecturers. The institutional barrier will be considered in relation to level of accessibility, technical support and ICT professional development that are provided by the institution of the lecturers for the effective utilization of ICT in teaching.

We intend to adapt instruments that were successfully developed and used internationally (see for example, Wright et al., 2005; Ball et al., 2008; Hart et al., 1981; Ryan and McCrae, 2006; Askew et al., 1997). Using these instruments, our aim is to unpack in-depth how these barriers as described in the literature plays out in the context of colleges of education in North Eastern Nigeria. Therefore, understanding these barriers (both institutional and Lecturers) can provide an important insight towards proper utilization of ICTs into colleges of Education in Nigeria. We intend to pilot these instruments with a sample of three Colleges of Education in Yobe State. In this, we are expecting to test a sample of 100 college lecturers (10 per school).

Keywords: Lecturers Perception, Utilization of Information, Communication Technology, North Eastern Nigeria

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INTRODUCTION

The use of technology for teaching is one of the critical issues in education that is wide spread in all institutions of learning (Afshari, et al., 2009). Globally, advances in technology has initiated an emphasis towards the use of information and communication technology (ICT) in the educational system for delivery of quality education (Gabriel et al., 2014). This advancement which ICT resources offers to higher institution, can be seen through accessibility to quality resource material and its utilization in instructional delivery.

The effective utilization of ICT is particularly evident when teachers are competent in the use of these resource materials to enhance the teaching and learning process (Gabriel, et al. 2014). It is imperative to note that in this era of technological advancement, ICT facilities are necessary tools that are required for training of modern teachers. ICT is considered as one of the major tool for enhancing the educational system therefore, the use of ICT in teacher education institutions deserve to be given importance and priority for its role in developing prospective teachers in Nigeria (Onwuagboke, et al, 2014).

In the preparation of teachers at all levels of our educational system in Nigeria, ICT has a lot to offer in this direction. However, the usage of ICT in facilitating teacher education is still a myriad in Nigeria as many of the teachers are not ICT literate and those under training in Colleges of Education, Institutes of Education and Faculties of Education in Nigerian universities are not fully exposed to the use of ICT in the acquisition of skills and practical teaching (Owolabi, et al., 2013). Nigeria as a developing nation is getting stronger by the day but one important index of strength is the quality of education provided her citizenry (Seweje, 2006). Today, in most developed countries, nearly every aspect of human life including education is ICT driven. The education sector in Nigeria still lags behind in this aspect of technology. However, concerted efforts are being channeled towards this direction by the government in order to ensure the integration of ICT in most of the government owned institutions.

In order to ensure effective implementation of ICT in Nigeria, the Nigeria government implemented its ICT policy in April 2001 after the Federal Executive Council approved it, and was followed by the enactment of the National Information Technology Development Agency Act 2007 which became the legal platform for the creation of the National Information Technology Development Agency NITDA the implementing body. The policy empowers NITDA to enter into strategic alliances and joint ventures and to collaborate with different sectors in the economy to realize the specifics of the country's vision of, "making Nigeria an IT capable country in Africa (Agyeman, 2007). ICT in education in Nigeria is one of the area of great concern in the ICT policy. The Policy has an objective to integrate ICT into the mainstream of education and training this includes all level of the educational institutions from the primary level to the tertiary level to implement the use of ICTs for effective instructional delivery. This National ICT Policy ensures all sectors performance and efficiency, in order to support the

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Our Choice of initial teacher assessment is drawn from two bases. Firstly, there is growing body of literature on lecturers perceptions of Barriers to effective utilization of ICT in education internationally (Borko, 2004; Huang & Bao, 2006; Turner & Rowland, 2011) that testifies the importance of understanding and developing teachers ICT knowledge for and in teaching as a tool for improving the quality of ICT teaching and learning. This body of research attuned to the fact that the knowledge needed for teaching is different from the that needed by other professionals (Ball et al., 2008). Secondly, there is limited local literature in Nigeria, at NCCE that reported the current status of teachers' ICT knowledge using rigorously developed measures of these constructs.

We intend to adapt measures that were successfully developed and used internationally (See for example, Wright et al., 2005; Ball et al., 2008; Hart et al., 1981; Ryan and McCrae, 2006; Askew et al., 1997). Using these measures, our aim is to categorize the current status for our teachers' ICT Technological knowledge content and that of Institutional level of accessibility and technological support and the sophistication of the strategies lecturers used in solving ICT tasks.

PROBLEM STATEMENT

There seems to be growing concern by all stakeholders in education that the condition of ICT in teaching and learning in Nigeria is unacceptable. However, despite the wide acknowledgement of the importance of ICT in teaching and learning, it has been shown that ICT facilities are not being effectively utilized by lecturers in colleges of education in north eastern Nigeria. Today, in some tertiary institutions in Nigeria, there are reasonable ICT structures and equipment that have been procured by government in an effort to integrate ICTs in teaching and learning. However, these resources are not effectively utilized, as evident by many tertiary institutions are still operating in an analogue age (Thomas, et al., 2017). The utilization of ICT in the teaching and learning process in colleges of Education has been an issue

that needs to be assessed in order to determine the extent to which ICT integration has impacted on knowledge delivery.

This lack of noticeable improvement might be due to the lack of clear understanding of the status of our teachers' knowledge and practice on one hand, and the condition of institutional technological support on the other hand before designing interventions. Therefore, the information for understanding the current status of lecturers' perception on the utilization of ICT tools in colleges of education is very critical in the design of interventions that can be responsive to the current realities of our school system. Hence, this baseline study is intended to collect and analyze this information for use in the development of feasible interventions for addressing the current challenges of lecturers' barriers and institutional barriers towards given out the technical support needed by Colleges of the North Eastern Schools in Nigeria.

OBJECTIVE(S) OF THE STUDY

The objectives of this baseline project for Research and Development project are as follows:

- To determine lecturers' perceptions on the level of technological knowledge and skills they possessed towards effective utilization of ICTs in colleges of education in North eastern Nigeria
- To determine lecturers' perceptions on levels of technology pedagogical knowledge they possessed towards effective utilization of ICTs in colleges of education in North eastern Nigeria
- To find out lecturers' perceptions on the issue of access to ICT facilities by their institution for utilization in Colleges of education in North Eastern Nigeria.
- To find out the lecturers' perceptions on the kind of ICT-based professional development made available to them by their institutions towards effective utilization of ICTs in teaching.

LITERATURE REVIEW

The focus of this research project is to investigate lecturers' perception on barriers to effective utilization of ICT in Colleges of Education North Eastern Zone Nigeria, this could be a study that would collect and analyze a baseline data that can provide information for designing feasible interventions that are responsive to the current realities of the status of teaching and learning of ICT in our tertiary institutions today. Therefore, this section locates the proposed research into literature and theory on assessment of lecturers and institutional knowledge as well as the technological support. By so doing, we organized this literature into the following broad parts. The first part deals with the conceptualization of lecturers' ICT knowledge. to give the study a firm status; theoretical framework of the study, ICT in Education, Barriers towards the Effective Utilization of ICT in Education, and Empirical Studies. Barriers towards the Effective institutional provision of ICT in Education, and a summary of the literature review section were discussed.

THEORETICAL FRAMEWORK

Many theories and empirical studies exist on the barriers to the utilization of ICTs. This study is considering two theoretical frameworks, because the research questions raised may not be sufficiently answered using a single theory. Technological Pedagogical Content Knowledge (TPACK) by Mishra and Koehler (2006) and the Innovation Diffusion Theory. TPACK expounds on the teachers' knowledge on the use of technology for teaching while the innovation diffusion theory is directed towards the institutional barriers on the acceptance of ICT into the system.

Theoretical framework on the innovation diffusion theory

Rogers, (1996) proposed a diffusion theory, as a process of bringing in something new into a system that is already structured to function without it, the process of diffusion occurs over a period of time, and can be seen as having five distinct stages. These are: Knowledge; Persuasion, Decision, Implementation, Confirmation: Roger in his theory explained, given that decisions are not authoritative or collective, each member of the social system faces his/her own innovation-decision that follows a 5-step process

- 1) Knowledge – person becomes aware of an innovation and has some idea of how it functions,
- 2) Persuasion – person forms a favorable or unfavorable attitude toward the innovation,
- 3) Decision – person engages in activities that lead to a choice to adopt or reject the innovation,
- 4) Implementation – person puts an innovation into use,
- 5) Confirmation – person evaluates the results of an innovation-decision already made.

The innovation diffusion theory can be linked to the decision by the institution of the colleges of education to either adopt the use of ICTs or can relate to why the use of ICTs in colleges of education is faced with certain institutional barriers.

Relating the innovation diffusion theory to the use of ICTs in the educational institution, the term knowledge can be seen as having the knowledge of the technology, what it is and its function. Persuasion, this can be seen as an attempt made by the government or the institution to make the lecturers adopt the use of ICT facilities, this can be done in several ways, for example making the facilities available and accessible also reward can be given to lecturers who make effective use of the facilities to enhance their teaching process.

Decision this is the decision made by the institution and lecturers to adopt the use of the ICT facilities to enhance the teaching process this is also a very important point in the diffusion process because the diffusion of ICT has to come from deciding and agreeing to adopt the innovation. Implementation this is a process of moving an idea from concept to reality, a process of making it a working process, this is a state of fully diffusing the ICT facilities into the system and ensuring everything that is required for the process to work is put in place.

Lastly we have the confirmation this is an official indication that the diffusion process of ICT in education would happen as planned having put all the structure and logistics in place. The lecturers may vary greatly in their willingness to adopt a particular innovation. This is due to the fact that Individual characteristics differs and the way they accept innovations would also vary from individual to individual.

Theoretical framework on the Technological pedagogical content knowledge (TPACK)

The TPACK framework builds on Shulman's (1987, 1986) descriptions of PCK to describe how teachers' understanding of educational technologies and PCK interact with one another to produce effective teaching with technology.

In the TPACK model there are three main components of teachers' knowledge: content, pedagogy, and technology. Equally important to the model are the interactions between and among these bodies of knowledge, represented as PCK, (pedagogical content knowledge) TCK

(technological content knowledge), TPK (technological pedagogical knowledge), and TPACK (technological pedagogical content knowledge) these terms are explained below.

Content Knowledge

Content knowledge (CK) is teachers' knowledge about the subject matter to be learned or taught. The content to be covered in middle school science or history is different from the content to be covered in an undergraduate course on art appreciation or a graduate seminar on astrophysics. Knowledge of content is of critical importance for teachers. As Shulman (1986) noted, this knowledge would include knowledge of concepts, theories, ideas, organizational frameworks, knowledge of evidence and proof, as well as established practices and

approaches toward developing such knowledge. Knowledge and the nature of inquiry differ greatly between fields, and teachers should understand the deeper knowledge fundamentals of the disciplines in which they teach.

Pedagogical Knowledge

Pedagogical knowledge (PK) is teachers' deep knowledge about the processes and practices or methods of teaching and learning. They encompass, among other things, overall educational purposes, values, and aims. This generic form of knowledge applies to understanding how students learn, general classroom management skills, lesson planning, and student assessment. It includes knowledge about techniques or methods used in the classroom; the nature of the target audience; and strategies for evaluating student understanding. A teacher with deep pedagogical knowledge understands how students construct knowledge and acquire skills and how they develop habits of mind and positive dispositions toward learning. As such, pedagogical knowledge requires an understanding of cognitive, social, and developmental theories of learning and how they apply to students in the classroom.

Pedagogical Content Knowledge

PCK is consistent with and similar to Shulman's idea of knowledge of pedagogy that is applicable to the teaching of specific content. Central to Shulman's conceptualization of PCK is the notion of the transformation of the subject matter for teaching. Specifically, according to Shulman (1986), this transformation occurs as the teacher interprets the subject matter, finds multiple ways to represent it, and adapts and tailors the instructional materials to alternative conceptions and students' prior knowledge. PCK covers the core business of teaching, learning,

curriculum, assessment and reporting, such as the conditions that promote learning and the links among curriculum, assessment, and pedagogy. An awareness of common misconceptions and ways of looking at them, the importance of forging connections among different content-based ideas, students' prior knowledge, alternative teaching strategies, and the flexibility that comes from exploring alternative ways of looking at the same idea or problem are all essential for effective teaching.

Technology Knowledge

Technology knowledge (TK) is means having the knowledge and skills of using the technology. The definition of TK used in the TPACK framework is close to that of Fluency of Information Technology, as proposed by the Committee of Information Technology Literacy of the National Research Council (NRC, 1999). They argue that fluency in using technology goes beyond traditional notions of computer literacy to require that persons understand information technology broadly enough to apply it productively at work and in their everyday lives, to recognize when information technology can assist or impede the achievement of a goal, and to continually adapt to changes in information technology. Therefore, having TK requires a deeper, more essential understanding and mastery of information technology for information processing, communication, and problem solving than does the traditional definition of computer literacy. Acquiring TK in this manner enables a person to accomplish a variety of different tasks using information technology and to develop different ways of accomplishing a given task. This conceptualization of TK does not posit an "end state," but rather sees it developmentally, as evolving over a lifetime of generative, open-ended interaction with technology.

Technological Content Knowledge

Understanding the impact of technology on the practices and knowledge of a given discipline is critical to developing appropriate technological tools for educational purposes. The choice of technologies affords and constrains the types of content ideas that can

be taught. Likewise, certain content decisions can limit the types of technologies that can be used. Technology can constrain the types of possible representations, but also can afford the construction of newer and more varied representations. Furthermore, technological tools can provide a greater degree of flexibility in navigating across these representations.

TCK, then, is an understanding of the manner in which technology and content influence and constrain one another. Teachers need to master more than the subject matter they teach; they must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies. Teachers need to understand which specific technologies are best suited for addressing subject-matter learning in their domains and how the content dictates or perhaps even changes the technology or vice versa.

Technological Pedagogical Knowledge

TPK is an understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies. To build TPK, a deeper understanding of the constraints and affordances of technologies and the disciplinary contexts within which they function is needed.

For example, consider how whiteboards may be used in classrooms. Because a whiteboard is typically immobile, visible to many, and easily editable, its uses in classrooms are presupposed. Thus, the whiteboard is usually placed at the front of the classroom and is controlled by the teacher. This location imposes a particular physical order in the classroom by determining the placement of tables and chairs and framing the nature of student-teacher interaction, since students often can use it only when called upon by the teacher. However, it would be incorrect to say that there is only one way in which whiteboards can be used. One has only to compare the use of a whiteboard in a brainstorming meeting in an advertising agency setting to see a rather different use of this technology. In such a setting, the whiteboard is not under the purview of a single individual. It can be used by anybody in the group, and it becomes the focal point around which discussion and the negotiation/construction of meaning occurs. An understanding of the affordances of technology and how they can be leveraged differently according to changes in context and purposes is an important part of understanding TPK.

Technology, Pedagogy, and Content Knowledge

TPACK is an emergent form of knowledge that goes beyond all three "core" components (content, pedagogy, and technology). Technological pedagogical content knowledge is an understanding that emerges from interactions among content, pedagogy, and technology knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. Instead, TPACK is the basis of effective teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

By simultaneously integrating knowledge of technology, pedagogy and content, expert teachers bring TPACK into play any time they teach. Each situation presented to teachers is a unique combination of these three factors, and accordingly, there is no single technological solution that applies for every teacher, every course, or every view of teaching. Rather, solutions lie in the ability of a teacher to flexibly navigate the spaces defined by the three elements of content, pedagogy, and technology and the complex interactions among these elements in specific contexts.

Understanding the TPACK framework, offers several possibilities for promoting research in teacher education, teacher professional development, and teachers' use of technology. It offers options for looking at a complex phenomenon like technology integration in ways that are now amenable to analysis and development. Moreover, it allows teachers, researchers, and teacher educators to move beyond oversimplified approaches that treat technology as an "add-on" instead to focus again, and in a more ecological way, upon the connections among technology, content, and pedagogy as they play out in classroom contexts.

ICT in Education

Based on review on the benefit of information communication technology (ICT) in education, the need appeared to understand the effect, use and importance in teaching and learning, and the impact it has on lecturers, students' academic performance and the educational environment as a whole. ICTs is said to help expand access to education, strengthen the educational workplace, and raise educational quality. However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICT. The direct link between ICT use and students' academic performance has been the focus of extensive literature during the last two decades. ICT helps students to their learning by improving the communication between them and the instructors (Valasidou and Bousiou, 2005). Research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century. Kulik's (2003) meta-analysis study revealed that, on average, students who used ICT-based instruction scored higher than students without computers. ICTs facilities enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way.

Importance of ICT in Education

This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to Zhao and Czik (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002) concludes that the benefits of ICT will be gained when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001).

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achievement of a goal, and to continually adapt to changes in information technology. Therefore, having TK requires a deeper, more essential understanding and mastery of information technology for information processing, communication, and problem solving than does the traditional definition of computer literacy. Acquiring TK in this manner enables a person to accomplish a variety of different tasks using information technology and to develop different ways of accomplishing a given task. This conceptualization of TK does not posit an "end state," but rather sees it developmentally, as evolving over a lifetime of generative, open-ended interaction with technology.

Technological Content Knowledge

Understanding the impact of technology on the practices and knowledge of a given discipline is critical to developing appropriate technological tools for educational purposes. The choice of technologies affords and constrains the types of content ideas that can be taught. Likewise, certain content decisions can limit the types of technologies that can be used. Technology can constrain the types of possible representations, but also can afford the construction of newer and more varied representations. Furthermore, technological tools can provide a greater degree of flexibility in navigating across these representations.

TCK, then, is an understanding of the manner in which technology and content influence and constrain one another. Teachers need to master more than the subject matter they teach; they must also have a deep understanding of the manner in which the subject matter (or the kinds of representations that can be constructed) can be changed by the application of particular technologies. Teachers need to understand which specific technologies are best suited for addressing subject-matter learning in their domains and how the content dictates or perhaps even changes the technology or vice versa.

Technological Pedagogical Knowledge

TPK is an understanding of how teaching and learning can change when particular technologies are used in particular ways. This includes knowing the pedagogical affordances and constraints of a range of technological tools as they relate to disciplinarily and developmentally appropriate pedagogical designs and strategies. To build TPK, a deeper understanding of the constraints and affordances of technologies and the disciplinary contexts within which they function is needed.

For example, consider how whiteboards may be used in classrooms. Because a whiteboard is typically immobile, visible to many, and easily editable, its uses in classrooms are presupposed. Thus, the whiteboard is usually placed at the front of the classroom and is controlled by the teacher. This location imposes a particular physical order in the classroom by determining the placement of tables and chairs and framing the nature of student-teacher interaction, since students often can use it only when called upon by the teacher. However, it would be incorrect to say that there is only one way in which whiteboards can be used. One has only to compare the use of a whiteboard in a brainstorming meeting in an advertising agency setting to see a rather different use of this technology. In such a setting, the whiteboard is not under the purview of a single individual. It can be used by anybody in the group, and it becomes the focal point around which discussion and the negotiation/construction of meaning occurs. An understanding of the affordances of technology and how they can be leveraged differently according to changes in context and purposes is an important part of understanding TPK.

Technology, Pedagogy, and Content Knowledge

TPACK is an emergent form of knowledge that goes beyond all three "core" components (content, pedagogy, and technology). Technological pedagogical content knowledge is an understanding that emerges from interactions among content, pedagogy, and technology knowledge. Underlying truly meaningful and deeply skilled teaching with technology, TPACK is different from knowledge of all three concepts individually. Instead, TPACK is the basis of effective

teaching with technology, requiring an understanding of the representation of concepts using technologies; pedagogical techniques that use technologies in constructive ways to teach content; knowledge of what makes concepts difficult or easy to learn and how technology can help redress some of the problems that students face; knowledge of students' prior knowledge and theories of epistemology; and knowledge of how technologies can be used to build on existing knowledge to develop new epistemologies or strengthen old ones.

By simultaneously integrating knowledge of technology, pedagogy and content, expert teachers bring TPACK into play any time they teach. Each situation presented to teachers is a unique combination of these three factors, and accordingly, there is no single technological solution that applies for every teacher, every course, or every view of teaching. Rather, solutions lie in the ability of a teacher to flexibly navigate the spaces defined by the three elements of content, pedagogy, and technology and the complex interactions among these elements in specific contexts.

Understanding the TPACK framework, offers several possibilities for promoting research in teacher education, teacher professional development, and teachers' use of technology. It offers options for looking at a complex phenomenon like technology integration in ways that are now amenable to analysis and development. Moreover, it allows teachers, researchers, and teacher educators to move beyond oversimplified approaches that treat technology as an "add-on" instead to focus again, and in a more ecological way, upon the connections among technology, content, and pedagogy as they play out in classroom contexts.

ICT in Education

Based on review on the benefit of information communication technology (ICT) in education, the need appeared to understand the effect, use and importance in teaching and learning, and the impact it has on lecturers, students' academic performance and the educational environment as a whole. ICTs is said to help expand access to education, strengthen the educational workplace, and raise educational quality.

However, the experience of introducing different ICTs in the classroom and other educational settings all over the world over the past several decades suggests that the full realization of the potential educational benefits of ICT. The direct link between ICT use and students' academic performance has been the focus of extensive literature during the last two decades. ICT helps students to their learning by improving the communication between them and the instructors (Valasidou and Bousiou, 2005). Research has shown that the appropriate use of ICTs can catalyze the paradigmatic shift in both content and pedagogy that is at the heart of education reform in the 21st century. Kulik's (2003) meta-analysis study revealed that, on average, students who used ICT-based instruction scored higher than students without computers. ICTs facilities enable new ways of teaching and learning rather than simply allow teachers and students to do what they have done before in a better way.

Importance of ICT in Education

This can help to improve and develop the quality of education by providing curricular support in difficult subject areas. To achieve these objectives, teachers need to be involved in collaborative projects and development of intervention change strategies, which would include teaching partnerships with ICT as a tool. According to Zhao and Cziko (2001) three conditions are necessary for teachers to introduce ICT into their classrooms: teachers should believe in the effectiveness of technology, teachers should believe that the use of technology will not cause any disturbances, and finally teachers should believe that they have control over technology. However, research studies show that most teachers do not make use of the potential of ICT to contribute to the quality of learning environments, although they value this potential quite significantly (Smeets, 2005). Harris (2002) conducted case studies in three primary and three secondary schools, which focused on innovative pedagogical practices involving ICT. Harris (2002)

concludes that the benefits of ICT will be gained when confident teachers are willing to explore new opportunities for changing their classroom practices by using ICT. As a consequence, the use of ICT will not only enhance learning environments but also prepare next generation for future lives and careers (Wheeler, 2001).

Changed pool of teachers will come changed responsibilities and skill sets for future teaching involving high levels of ICT and the need for more facilitative than didactic teaching roles (Littlejohn et al., 2002). According to Cabero (2001), "the flexibility of time-space accounted for by the integration of ICT into teaching and learning processes contributes to increase the interaction and reception of information. Such possibilities suggest changes in the communication models and the teaching and learning methods used by teachers, giving way to new scenarios which favour both individual and collaborative learning".

The use of ICT in educational settings, by itself acts as a catalyst for change in this domain. ICTs by their very nature are tools that encourage and support independent learning. Students using ICTs for learning purposes become immersed in the process of learning and as more and more students use computers as information sources and cognitive tools (Reeves & Jonassen, 1996).

ICTs Provides New Educational Approaches

ICT has the potential to remove the barriers that are causing the problems of low rate of education in any country. It can be used as a tool to overcome the issues of cost, less number of teachers, and poor quality of education as well as to overcome time and distance barriers (McGorry, 2002). People have to access knowledge via ICT to keep pace with the latest developments (Plomp, Pelgrum & Law, 2007). ICT can be used to remove communication barriers such as that of space and time (Lim and Chai, 2004). ICTs also allow for the creation of digital resources like digital libraries where the students, teachers and professionals can access research material and course material from any place at any time (Bhattacharya and Sharma, 2007; Cholin, 2005). Such facilities allow the networking of academics and researchers and hence sharing of scholarly material. This avoids duplication of work (Cholin, 2005). ICT eliminating time barriers in education for learners as well as teacher. It eliminates geographical barriers as learners can log on from any place (Sanyal, 2001; Mooij, 2007; Cross and Adam, 2007; UNESCO, 2002; Bhattacharya and Sharma, 2007).

ICT provides new educational approaches (Sanyal, 2001). It can provide speedy dissemination of education to target disadvantaged groups (UNESCO, 2002; Chandra and Patkar, 2007). ICT enhances the international dimension of educational services (UNESCO, 2002). Use of ICT in education develops higher order skills such as collaborating across time and place and solving complex real world problems (Bottino, 2003; Bhattacharya and Sharma, 2007; Mason, 2000; Lim and Hang, 2003). It improves the perception and understanding of the world of the student. Thus, ICT can be used to prepare the workforce for the information society and the new global economy (Kozma, 2005). Plomp et al (2007) state that the experience of many teachers, who are early innovators, is that the use of ICT is motivating for the students as well as for the teachers themselves. Bottino (2003) and Sharma (2003) mention that the use of ICT can improve performance, teaching, administration, and develop relevant skills in the disadvantaged communities. It also improves the quality of education by facilitating learning by doing, real time conversation, delayed time conversation, directed instruction, self-learning, problem solving, information seeking and analysis, and critical thinking, as well as the ability to communicate, collaborate and learn (Yuen et al, 2003). A great deal of research has proven the benefits to the quality of education (Al-Ansari 2006). Hepp, Hinojosa, Laval and Rehbein (2004) state that the literature contains many unsubstantiated claims about the revolutionary potential of ICTs to improve the quality of education. They also note that some claims are now deferred to a near future when hardware will be presumably more affordable and software will become, at last, an effective learning tool.

ICT Serves as a Tool to Curriculum Differentiation,

Furthermore, ICT may serve as a tool to curriculum differentiation, providing opportunities for adapting the learning content and tasks to the needs and capabilities of each individual pupil and by providing tailored feedback (Mooij, 1999; Smeets & Mooij, 2001). As Stoddart and Niederhauser (1993) point out, ICT may fit into a spectrum of instructional approaches, varying from traditional to innovative. Another aspect which may of course influence the use of ICT is access to technology (Kennewell, Parkinson, & Tanner, 2000; OTA, 1995). This refers not only to the number of computers, but also to the placement of the equipment, e.g. in the classroom or in a computer room. Kennewell et al. (2000) feel it is essential that computers be placed in the classroom, in order to maximize the opportunities for curriculum activity.

ICT environment improves the experience of the students and teachers and to use intensively the learning time for better results. The ICT environment has been developed by using different software and also the extended experience in developing web based and multimedia materials.

Barriers towards the Effective Utilization of ICT in Education

According to Ajayi (2008), the effective utilization of ICT in teaching and learning depends on the availability of these facilities and teachers' competence in using them. This includes teachers' pedagogical issues, professional development and technical support provided to the teachers by the institutions, these are some of the barriers that could hinder the effective utilization of ICT facilities in institution.

Pedagogical Issues on the use of ICT

The teacher's own pedagogical beliefs and values play an important part in shaping technology-mediated learning opportunities. Teachers need extensive knowledge of ICT to be able to select the most appropriate resources. They also need to understand how to incorporate the use of ICT into their lessons, they may need to develop new pedagogies to achieve this. (Cox and Abbott, 2003) It has generally been found that pre-service teachers have demonstrated their ability for integrating technology into their teaching, but do not have the necessary pedagogy on how to use technology in teaching. They will probably avoid teaching with technology once the requirement for the demonstration lesson is over. Hence, a negative attitude about teaching with and about technology in a subject matter area could work against well-planned instruction in teacher preparation programs. While, on the other hand, those teacher candidates who believe in the potential and utility of technology in the classroom and continue facing many challenges become the models for student teachers to emulate. Many studies have been conducted with regard to the attitude of teachers towards use and interactions of technology have revealed the importance of attitudes for learning to use technologies (Cox, Rhodes & Hall, 1988; Davidson & Ritchie, 1994; Hannaford, 1988; Kay, 1990). Therefore, it is crucial that teacher preparation programs should develop the cognitive, social, and physical environments that will help teachers feel efficacious and in control of learning to teach with technology, a domain that is often overwhelming even for experienced teachers.

Professional Development Issues

Teacher professional development predominantly is one of the important tools needed by the teachers for proper integration of ICT in institutions it should be focused on pedagogy, content and technology. Unfortunately, most teacher training programs do not focus the pedagogical principles which facilitate the use of ICT into teaching learning. The multifaceted relationship among technology, pedagogy, and content has not been effectively addressed (Okojie, Olinzock & Okojie-Boulder 2006). Therefore, this relationship is to be considered in all the three phases of the training model, depending on the teachers'

need. A training needs assessment should come first in all phases of the professional development programs. Continuous support for the effective integration of ICT in the training program.

Lack of Technical Support

The National Council for the Accreditation of Teacher Education (NCATE) (1997) reported the lack of technical support as one of the major barriers that resulted in computers being underutilized in the classes. Teachers do not want to use computers because they were not sure where to turn for help when something went wrong while using computers.

Butler and Sellbom (2002) carried out a study on barriers to adopting technology for teaching and learning. Regarding to the role of technical support staff, they recommended that schools should work to convince technology staff that reliability is very important, especially concerning technology in classrooms; encourage the purchase of highly reliable technologies; improve systems for checking and maintaining classroom technologies; create new approaches (including staff training) to assure that extremely rapid responses are made to breakdowns; new classroom technology setups should be tested by faculty before they are installed; classrooms should be as similar as possible, differences in the technologies in each classroom should be well documented, help faculty learn by encouraging faculty discussions about teaching, learning and technology; identify faculty who have used and evaluated the impact of technologies on learning and organize a workshop, conference, or set of papers to make this information more widely available to faculty, encourage faculty to assess and evaluate the impact of technologies on learning, identify attitudes and behaviors that are seen as poor or inadequate support and work with technology staff to reduce these, rapid response system must be in place that can deal with a wide range of problems. Therefore, lack of technical support is very stressful for the teacher, which may affect the teacher's willingness in the adoption of ICT (Tong & Trinidad, 2005).

Fear of Change

Another barrier to the utilization of ICT in Nigeria universities is the fear of changing from old ways of doing things to new and modern methods. This is normal in all human activities and lives processes, as people tend to be comfortable and hold on to the old ways of doing things rather than adopt new processes. Notwithstanding, changing from old practice to modern ways is challenging to any establishment, be it an institution of learning or any form of organization. It is difficult because it involves planning, time, disruptions, organizational changes and downsizing or increase in personnel as the case may be. The universities are not left out in this traditional habit, as most university staff are in their mid-age and as such tend to shy away from modern technologies, with the excuse that they are of the older generation and have no time to learn the new generation's ways of doing things (Idowu & Esere, 2013).

Empirical studies related to the barriers to the effective utilization of ICTs in institutions

Nayef Alkawaldeh (2014) in his research to explore the barriers to utilizing information and communication technologies for teaching and learning in Jordan the research involved students, teachers, and administrators. His work investigates these barriers through an interpretative case study which is the Jordanian Education Initiative (JEI) and uses the technology-to-performance chain model (TPC) as a conceptual research framework. Fifteen barriers were identified based on this qualitative research; twelve of them can be directly attributed to utilization factors proposed by the TPC model which were also viewed as barrier factors (expected consequences and affect toward use, habit, social norms, and facilitating condition); significant number of identified barriers can be related to "facilitating conditions" which puts more responsibility on the ministry of education to offer more

resources and opportunities to facilitate the process of integrating technology into education.

Onwuagboke & Singh (2014) in their work on perceived challenges to effective ICT utilization in teacher education in south-eastern Nigeria, stated that with the general acceptance of information and communications technology (ICT) as a veritable tool for teaching and learning coupled with its great potentials for educational advancement in the 21st century learning environment, they examined the availability and the challenges of integrating ICT in teacher education programs in south-eastern Nigeria. According to the data that was collected the findings show that only a few resources are available in these institutions. The availability of ICT resources was low and therefore inadequate with numerous challenges facing the integration of ICT in teacher education ranging from lack of adequate training of teacher educators, epileptic power supply to high cost of ICT resources, and concluded that the numerous obstacles to effective ICT integration in teacher education need urgent attention if the gains of ICT in education must be reaped in our teacher educational programs.

Afshari, et al., (2009) conducted a research studies on factors affecting teachers' use of information and communication technology and their findings showed that computer technology is an effective means for widening educational opportunities, but most teachers neither use technology as an instructional delivery system nor integrate technology into their curriculum also their studies revealed a number of factors influencing teachers' decisions to use ICT in the classroom: non-manipulative and manipulative school and teacher factors, they noted that these factors are interrelated and the success of the implementation of ICT is not dependent on the availability or absence of one individual factor, but is determined through a dynamic process involving a set of interrelated factors. They suggest that ongoing professional development must be provided for teachers to model the new pedagogies and tools for learning with the aim of enhancing the teaching-learning process. However, it is important for teacher trainers and policy makers to understand the factors affecting effectiveness and cost-effectiveness of different approaches to ICT use in teacher training so training strategies can be appropriately explored to make such changes viable to all.

N.D.Oye et al, (2011) conducted a research on a model of ICT acceptance and use for teachers in higher education institutions this research was based on understanding why people accept or reject new information or communication technology which has been one of the most challenging issues in the study of ICT acceptance model. The study considered the models TAM and UTAUT to understand the teacher's behavioral intention on the acceptance and use of the technology. This study was conducted at the university of Jos Plateau state, Nigeria as a pilot study. One hundred questionnaires were administered and collected, containing 23 UTAUT survey questions and 9 demographic statements totaling 32 questions. The survey shows that, 57% were male and 43% were female. By using the pilot study questionnaire, the following questions were asked (a) Is ICT mandatory or Voluntary in your institution? (b) What are the greatest barriers to using ICT to you as an academician? Based on the result collected (42%) which said that their problem is time; on the other hand, (31%) said that the problem is training. Others respondents (4%) said that cost are their problem, another group (20%) said that they need compensation and the final group (3%) said that, it does not fit their programme. This implies that the university ICT make task more easily accomplished, thereby making them more productive. Hence result from the survey shows that 86.5% agree. Therefore, the researchers recommend based on their findings, that all employed teachers in Federal, State and Private universities should undertake mandatory training and retraining on ICT programmes.

Zechia Walters Chifafie (2011) in his study investigating barriers to the integration of Information and Communication Technologies (ICTs) in teaching with special focus on the Faculties of Education and Health Sciences at the University of Buea. It also looks at the views and actual use of ICTs by faculty members of the aforementioned Faculties. The study adopted a qualitative approach. Data analysis revealed that faculty members of these Faculties perceive there is a comparative advantage over the traditional teacher-led method and are

willing to integrate them into their lessons, but fall short of financial, technical, material, and human resources. It revealed a number of obstacles that lie at the level of faculty members; the institution and the state which perturb the integration of ICTs in teaching in these Faculties. It was also realized that the most critical barriers lie at the level of the state, which until now has no detailed well-defined ICT policy document for higher education institutions, and as a consequence, universities have not made ICTs in education a priority. The study concludes that, the longtime reluctance of societies to accept and embrace science is affecting its methods of research especially in developing countries. Equally, the late penetration of ICTs in developing countries is affecting their institutions. Based on the findings the researcher recommends that faculty members as well as higher education institutions should be motivated in the various ways so that the importance and benefits of ICTs in education, in daily life and in the entire society be felt in Cameroon as it aims to become an emerging nation in the year 2035

Summary of the Literature Review

According to the literature reviewed, ICT has great benefits in the education system for both teachers and students to function effectively in an information age. ICT is seen as an important tool that teachers, lecturers can use to improve their service delivery. However, in spite of the numerous benefits of the use of ICT for educational purposes, research has shown that ICT facilities are underutilized in our institutions, this is as a result of some barriers encountered by the institutions and the lecturers in the effective utilization of the ICTs.

The literature reviewed revealed many factors that impede the use of ICT in teaching these factors include lack of technical support, access to technology, implementation time, lack of professional development of staff, lack of confidence and competence in the use of ICT, lack of encouragement by the institution, lack of support, slow connectivity, unreliable power supply, inadequate funding from government these are some of the challenges as stated in the literatures that prevent the proper utilization of ICT.

METHODOLOGY

This is an exploratory study that involves both quantitative and qualitative approach in data collection and analysis. In particular, we intend to use Convergent Parallel Design (Creswell, 2012), which is a design where both quantitative and qualitative data are simultaneously collected, then merged, so that the results of the research problem can be understood.

A basic rationale for this design is that one data collection form supplies strengths to offset the weaknesses of the other form, and that a more complete understanding of a research problem results from collecting both quantitative and qualitative data (Creswell, 2012:540).

Fig 1, Data collection framework (adapted from Creswell, 2012, p. 540)

We are targeting a sample of 12 colleges of education within the North eastern states. These schools will be selected based on: school location, average standards in terms of the basic ICT facilities and willingness of the teachers to participate in this project.

As detailed in the Introduction section of this proposal, we categorized the baseline study into two broad areas of focus, namely:

the lecturers, and institutional barriers. In each case we have two sets of assessment as summarized in Figure 2

Fig 2: Summary of the baseline conceptualisation

The ICT assessment test for lecturers and that of the Institution will be collected and analysed quantitatively. In this, we are expecting to test 120 lecturers (10 per school) and 144 departments (12 per institution). On the other hand, the LFiN test (which is interview based) and classroom observations will both be video-recorded and will be analysed quantitatively. In this, we are intending to observe 36 lessons (3 lecturers per school) and 108 departments across different colleges of education.

Expected o.Outputs/results

It is expected that the outputs of this research and development project will:

- Provide information for the design of feasible interventions for improving the teaching of ICT at colleges of Education in Nigeria.
- Provide information for the design of feasible interventions for improving lecturers' ICT knowledge and performance at colleges of Education in Nigeria.
- Provide support to the lecturers on capacity building, and encourage them on the integration of ICT in education. This is in the sense that these lecturers will be fully involved and introduced into cutting edge research on the use of ICT in education that is parallel to what is obtained internationally.

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