ASSESSMENT OF AVAILABILITY, ACCESSIBILITY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) RESOURCES IN CONTENT DELIVERY AMONG LECTURERS IN FEDERAL COLLEGES OF EDUCATION IN NIGERIA

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ZARIA

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Zaria

MAY, 2014

DECLARATION

I declare that the work in this dissertation entitled "Assessment of Availability, Accessibility and Utilization of Information and Communication Technology (ICT) Resources in Content Delivery among Lecturers in Federal Colleges of Education in Nigeria" has been performed by me in the Department of Educational Foundations and Curriculum under the supervision of Prof. A.K. Tukur, Prof. O.I. Jagusah and Dr. S. Sala'u. The information derived from the literature has been duly acknowledged in the text and a list of references provided. No part of this thesis was previously presented for another degree or diploma at any university.

_____ _____

Suleiman Abubakar ZUBAIRU **Date**

CERTIFICATION

This dissertation entitled **"**Assessment of Availability, Accessibility and Utilization of Information and Communication Technology (ICT) Resources in Content Delivery among Lecturers in Federal Colleges of Education in Nigeria**"** by Suleiman Abubakar ZUBAIRU meets the regulations governing the award of the degree of Doctor of Philosophy (Instructional Technology) in Department of Educational Foundations and Curriculum of Ahmadu Bello University, Zaria and is approved for its contribution to knowledge and literary presentation.

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DEDICATION

This research work is dedicated to the entire family of Zubairu Abubakar, my beloved mother, my lovely wife, my admirable sons Yahaya (Sudais), Muhammad Al- Amin and to my dear ones.

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ABSTRACT

This study aimed at assessing the availability, accessibility and utilization of Information and Communication Technology (ICT) resources among lecturers in content delivery in Federal Colleges of Education in Nigeria. Eight research questions and two hypotheses were drawn to guide the study. Related literatures were reviewed after the conceptual framework based on the major variables of the study. A Survey research design was adopted to conduct the study. The population of the study comprises of all the lecturers in Federal Colleges of Education in Nigeria. They are five thousand and seventy one (5,071) in number. A sample size of eight hundred and forty three (843) lecturers was used for the study; using cluster, simple random and proportional sampling techniques. A modified questionnaire tagged Teachers ICT usage survey from the ICT Survey Indicator for teachers and staff developed by both UNESCO (2004) and the New Zealand Ministry of Education (1999) was used for data collection. It was designed under seven (7) different sections and harmonized in one single questionnaire. Percentage was used to interpret the demographic data of the study, while frequency count was used to answer research questions 1-6 and descriptive statistics was used to answer research questions 7and 8 respectively. Independent t-test statistics was also used to answer research hypothesis 1 using mean and standard deviation, while one way ANOVA was used to answer hypothesis 2 using sum of square, degree of freedom, mean of sum of square, and were tested at $p<0.05$ level of significance using statistical package for social science. The two null hypotheses were rejected. The findings of this study revealed that ICT resources are not available in Federal Colleges of Education in Nigeria. It was also revealed that ICT resources which were supposed to be used in content delivery by lecturers in FCE were not accessible and also lecturers were not exposed and proficient in using ICT resources. This study also confirmed that the major challenge facing lecturers in using ICT is the irregularity in power supply. This study recommends, among others, that the Government, NCCE and the managements of FCE should join hands together and ensure that computer laboratories are available in FCE with adequate functional computer hardware and software and functional internet facilities that will cater for the need of both staff and students.

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ABBREVIATIONS

PGDE:	POST GRADUATE DIPLOMA IN EDUCATION
ICT:	INFORMATION AND COMMUNICATION TECHOLOGY
FCE:	FEDERAL COLLEGE OF EDUCATION
UNESCO:	UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION

OPERATIONAL DEFINITION OF TERMS

The following terms are defined in their relationship with this study as follows:

Availability: refers to the situation where ICT resources are sufficient, physically present and technically functional.

Fairly Available - refers to the situation where ICT resources are not sufficient.

Not Available – refers to the situation where ICT resources are not there.

Utilization: - refers to a situation where lecturers have knowledge of and skills to operate the computer system and navigate information on the Internet with ease in content delivery.

Accessibility: - refers to the level at which lecturers have a close contact with an ICT resources for optimal utilization.

Informationa and Communication Technology Resources: refers to computer hardwares and softwares, television, radio, data projector, overhead projector, digital camera and internet facilities used in teaching and learning.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

Information and Communication Technologies (ICTs) have become key tools and have a revolutionary impact on how people see and live in the world. The place of ICTs in education and the world in general cannot be ignored. Modern day businesses are conducted and facilitated through the use of telephones, fax machines and computer communication networks through the internet. This phenomenon has given birth to the contemporary e-commerce, e-government, e-medicine, e-banking and e-education among others. Bandele (2006) summed up that ICT is a revolution that involves the use of computers, internet and other telecommunication technology in every aspect of human endeavour. He posited that ICT is simply about sharing and having access to data with ease. It is regarded as the super highway through which information is transmitted and shared by people all over the world.

Ozoji as cited in (Jimoh, 2007) perceived ICT as the handling and processing of information (texts, images, graphs, instruction) for use, by means of electronic and communication devices such as computers, cameras, telephone. Ofodu (2007) also refers to ICT as electronic or computerized devices, assisted by human and interactive materials that can be used for a wide range of teaching and learning as well as for personal use. From these views, ICT could therefore be seen as processing and sharing of information using all kinds of electronic device, an umbrella that includes all technologies for the manipulation and communication of information.

Watson (2001) observed that, ICTs has revolutionized the way people work today and are now transforming education systems. As a result, if schools train children in yesterday's

skills and technologies they may not be effective and fit in to tomorrow's world. This is a sufficient reason for ICTs to win global recognition and attention. For instance, ICTs are dependable tools in facilitating the attainment of one of the Millennium Development Goals (MDGs), which is the achievement of universal primary education by the year 2015. Anan (2004), points out that in order to attain the goal of Universal Primary Education by the year 2015; we must ensure that information and communication technologies (ICTs) unlock the door of education systems. This indicates the growing demand and increasingly important place that ICTs could receive in education. Since ICTs provides greater opportunity for students and teachers to adjust learning and teaching to individual needs, society is forcing schools to give an appropriate response to this technical innovation.

The field of education has certainly been affected by the penetrating influence of ICT worldwide and in particular developed countries (Hilty, 2008). ICT has made a very profound and remarkable impact on the quality and quantity of teaching, learning and research in the educational institutions (Yusuf, 2005). Information and communication technology has the potentials to accelerate, enrich, and deepen skill; to motivate and engage students in learning to help relate school experiences to work practices; to help create economic viability for tomorrow's workers, contribute to radical changes in school; to strengthen teaching and provide opportunities for connection between the school and the world.

Aribisala (2006) notes that ICTs are increasingly playing an important role in organizations and in society's ability to produce, access, adopt and apply information. He also viewed ICTs as the tools for the post-industrial age and the foundations for a knowledge economy due to its ability to facilitate the transfer and acquisition of knowledge. Stressing the

importance of the use of ICT in education, (Olorunsola, (2007) is of the opinion that through ICT, educational needs have been met; it changes the needs of education as well as the potential processes. The message can be communicated through the email, telex or telephones particularly the mobile ones. The pervasiveness of ICT has brought about rapid technological, social, political and economic transformation, which has eventuated in a network society organized around ICT (Yusuf, 2005).

Ajayi (2008) posited that ICT is an indispensable part of educational administration as its application makes institutions more efficient and productive, thereby engendering a variety of tools to enhance and facilitate teachers' pedagogical activities. For instance, e-learning is becoming one of the most common means of using ICT to provide education to students both on and off campus by means of teaching online offered via web-based systems. Although ICT resources have been looked upon as tools for uplifting the standard of education in any nation, the level of compliance in implementing the ICT resources in the instructional development process leaves much to be desired in Nigerian higher education system.

Recent developments in ICT have drastically affected educational procedure for improved quality of education offered to students. ICT resources in instructional delivery in schools will serve a dual purpose and more efficient classroom instruction (Nzewi, 2009). It is in the pursuance of the need to access international best practices that the Federal government reviewed the National Policy on Education (1998) to the current one (NPE, 2004) to accommodate the introduction of ICT into the school system in keeping with the dynamics of social change and its demand on education. Colleges of Education prepare teachers that feed the primary and secondary school levels of education in Nigeria with

manpower demands. It is at this level that students should have their first encounter with technology in the classroom. The students will put to use when eventually leave school and are gainfully employed to teach in the primary and secondary schools.

It is in this light that the training of student teachers, who are expected to drive the new ICT advanced education system, is brought over. The advancement in which ICT resources offer in higher education, can be evidenced through accessibility to quality resource materials and instructional delivery. This can only be attained when it is drastically integrated into the instructional process in the teacher education system. Productive instructional delivery enhances learners' creative and intellectual development through the use of ICT resources, for instance, in the use of multimedia images, graphics, audio, text and motion for high quality learning. In order to build on existing knowledge, ICT today offers new tools for easy content delivery. However, this depends on the availability and accessibility of ICT tools. A major gap in most colleges of education in the onset of the 21st century is the gap in the availability and accessibility of ICT utilization.

1. 2 Statement of the Problem

A cursory look at the tertiary institutions in Nigeria has shown that many lecturers in the system still rely much on the traditional lecture method of teaching rather than embracing the use of ICT. The stage of enlightenment in which ICT could be accessed and utilised in education is still low. Many lecturers hardly accesse and utilise the benefit of ICT in teacher education. Okebukola (1997) observed that computers, smart board, data projector, digital camera, etc are not adequately available and are being much less utilized, therefore they are not part of classroom technology in most tertiary institutions in Nigeria, thus the lecture method and course materials/ handout continue to dominate classroom activities. This is an

indication that the students are still lagging behind in the trend of changes in the world of ICTs. This presupposes that there is the tendency for the students and teachers to be denied the opportunities which ICT offers in the teaching-learning activities. It is high time to replace the traditional pedagogical practices that still underpin the educational system in this country, hence the call for the application of ICT in education system (Adekomi, 2006). Beside, many Nigerian teachers have been unable to find effective ways to utilise technology in their content delivery or any other aspect of their teaching. The possible explanation for this lack of success by teachers according to Ololube, (2006) is not only that the utilzation of technology in the classroom has not been encouraging and teachers are not trained in using ICT in teaching as a means for educational sustainability, but the level of the teachers' exposure and proficency to the tool of ICT has been very minimal.

Moreover, as knowledge explorers, lecturers must as a matter of necessity be abreast with current ingestions, research network and innovations in instruction and instructional development. This knowledge can only be enhanced through adequate utilization of ICT resources which will also lead to quality instructional delivery aomg lecturers.

It is obvious that there are few studies that have looked at this phenomenon. Most of these studies were undertaken in primary schools, secondary schools or at the university level. Therefore, there is need for a study on this sector of Nigerian education in order to ascertain the feelings or opinions of teachers on ICTs availability, accessibility, utilization, proficiency, and its possible benefits and problems as it relates to content delivery. The utilization of ICT resources in content delivery is still a mirage in Nigeria; hence the need to gain an insight on the available and accessible ICT tools utilized in content delivery among lectures in FCE.

1.3 Objectives of the Study

The objectives of this study are to:

i) Identify the types of ICT resources available to lecturers in content delivery in Federal Colleges of Education in Nigeria.

ii) Ascertain the forms of ICT resources accessible to lecturers in content delivery in Federal Colleges of Education in Nigeria.

iii) Assess lecturers' perceived proficiency of utilizing ICT resources in content delivery in Federal Colleges of Education in Nigeria.

iv) Examine the lecturers' perceived usefulness of ICT resources in content delivery in Federal Colleges of Education in Nigeria.

v) Find out the lecturers 'perceived exposure to ICT resources utilization in content delivery in Federal Colleges of Education in Nigeria.

vi) Find out the challenges lecturers are facing in the utilization of ICT resources in content delivery in Federal Colleges of Education in Nigeria.

vii) To verity lecturers' gender influence on perceived ICT availability and utilization in content delivery in Federal Colleges of Education in Nigeria.

viii) To find out how lecturers' qualification influences their perception of ICT availability and utilization in content delivery in Federal Colleges of Education in Nigeria?

1.4 Research Questions

This study would seek answers to the following research questions:

i) Which types of the ICT resources are available to lecturers in content delivery in Federal Colleges of Education in Nigeria?

ii) Which forms of ICT resources do lecturers have access to and are been utilized in content delivery in Federal Colleges of Education in Nigeria?

iii) How proficient are lecturers in the utilization of ICT resources in content delivery in Federal Colleges of Education in Nigeria?

iv) How lecturers do perceived the usefulness of ICT resources in content delivery in Federal Colleges of Education in Nigeria?

v) What is the level of the lecturers' exposure to ICT resources in content delivery in Federal Colleges of Education in Nigeria?

vi) What are the challenges being faced by lecturers in the utilization of ICT resources in content delivery in Federal Colleges of Education in Nigeria?

vii) How do the perceptions of male lecturers differ from that of female lecturers on ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria?

viii) How do lecturers' qualifications influence their perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria?

1.5 Hypotheses

The following null hypotheses were formulated to guide the conduct of this study:

i) There is no significant difference between male and female lecturers' perception of ICT availability, accessibility and utilization in content delivery in Federal College of Education in Nigeria.

ii) There is no significant difference between lecturers' perception of ICT availability, accessibility and utilization in content delivery based on their qualifications.

1.6 Basic Assumptions

This study was informed by the following assumptions:

i) It is assumed that lecturers in Federal Colleges of Education in Nigeria are well exposed to ICT resources and also have positive perception towards the resources in content delivery.

ii) It is also assumed that lecturers in Federal Colleges of Education in Nigeria are provided with various ICT resources for content delivery.

iii) ICT resources form the vital component of content delivery in Federal Colleges of Education in Nigeria.

1.7 Significance of the Study

This study will serve as a useful document and also of great benefits to National Commission for Colleges of Education (NCCE), the body responsible for teacher training in Nigeria with the detailed information about the perception of lecturers towards ICT resources in content delivery. In the same vein, the findings of the study will help to enlighten the lecturers more on the significant of ICT resources in content delivery. It is anticipated that the research results would give colleges' administrators valuable insight into the efficiency of ICT resources, identify the areas of strengths and weaknesses, needs of the lecturers, evaluation of the services being offered, as well as area(s) that needs improvement. It is expected that those who are concerned with ICTs programme like the Ministry of Communication and Technology, National Information Technology

Development Agency (NITDA) may use the findings from this study to speed up campaign on the use of ICT in instructional Praxis.

This might be done through stakeholders' interactive session and comments, seminars and conducting capacity building activities for teachers. The Findings from this study might also benefit researchers by adding to the pool of information that already exists in this area. Researchers can therefore fall back on information gathered here by replicating this study in another setting.

It is also hoped that this study will bring new ideas and practical action among all stakeholders in both the policy realm and in higher education research environment. The recommendations arising from the findings will guide the NCCE management in setting priority for strategic planning in the area of Information Communication Technologies (ICTs).

1.8 Scope of the Study

This study covered six (6) Federal Colleges of Education in Nigeria. The colleges includes FCE Asaba, Adeyemi College of Education Ondo, Alvan Ikoku College of Education Owerri, FCE Katsina, FCE Okene and FCE Yola. This study was also centered on availability, accessibility and utilization of ICT resources by Federal Colleges of Education lecturers in content delivery in Nigeria.

In addition, the study was focused on ICT component used in content delivery. It specifically, covered ICT tools, internet resources and learning management system. The study was delimited to the ICT resources used in industrial and commercial purposes hence; this is a deliberate study in an array of ICT resources in content delivery.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents review of related literature based on the conceptual framework, ICTs in teacher education, teacher educators and instructional development of using ICTs, teacher educators' Perception about ICT resources available and accessible in colleges of education in Nigeria, perception of ICT by Nigerian Women Educators, the status of ICT in Nigerian educational system and ICT Policies in the Nigerian Education. It examine studies related to ICTs in the implementation of Nigerian educational reform, teacher educators' perception about the factors affecting the use ICTs, problems associated with ICTs use in Colleges of Education in Nigeria, as well empirical studies on lecturers' perception about ICT resources in content delivery.

2.2 Conceptual Framework

ICT is an acronym for information and communication technology. The word "information" according to World Health Organization (WHO) as cited in (Nwachukwu 2008) is a message intended for communication. It refers to knowledge and ideas which are provided in order to increase awareness in people. Information has to do with some of knowledge to be transmitted from agents of change to the target groups. Communication is one of the processes of transferring information to another.

To Onyeoma and Obiekezie (2000), communication is one of transferring ideas, skills or attitudes from one person to another accurately and satisfactorily. As science intend to explore all dimensions of information or message transmission including the emission, the source, and the nature of the message, the reception, the circumstance and the

effects of the transmission. Onyeoma and Obiekizie further posited that for communication to take place there must be a sender, a message, a transmission channel, a receiver who decodes and understands the message, a common language, time for the process to take place and one or more purposes to be served.

Succinctly, Ozuzu, Achunine and Emetarome (1997) citing Onyejemezi (1992) thought that communication is the process of sending and receiving information or message which include all the ways and manners through which we can let other people know and share our thoughts, feelings, experience and knowledge. It can also be defined as the process of interaction which involves the sharing of knowledge and experience between two parties- the communicator and communicate or sender and the receiver respectively.

Technology is a way of thinking about problems and feasibility of the proposed solution. As a word, it is usually misunderstood. Nwachukwu (2008) explained that technology is not a machine, but a planned systematic method of working to achieve planned outcomes. He further explained that technology involves system organizational patterns, procedures, various forms of analysis research and development. Therefore, ICT is a combination of microelectronic computer hardware and software, telecommunication that enables the processing and storage of huge amounts of information and its rapid dissemination through computer networks.

Information and communication technologies (ICTs) are information handling tools that are used to produce, store, process, distribute and exchange information. These different tools are now able to work together, and combine to form networked world- which reaches into every corner of the globe (UNDP Evaluation Office, 2001). It is an increasingly powerful tool for participating in global markets, promoting political accountability; improving the delivery of basic services; and enhancing local development

opportunities (UNDP, 2006). To Ogunsola (2005) ICT "is an electronic based system of information transmission, reception, processing and retrieval, which has drastically changed the way we think, the way we live and the environment in which we live". It can be used to access global knowledge and communication with other people (Ogunsola, 2005). Students who use ICTs gain deeper understanding of complex topics and concepts and are more likely to recall information and use it to solve problems outside the classroom (Apple Computer, 2002).

In addition, through ICT, students extend and deepen their knowledge, investigation, and inquiry according to their needs and interest when access to information is available on multiple levels (Technology, 2001). Information and Communication Technologies (ICTs) have impacted greatly on teaching, learning, research, and school management in a number of ways. Furthermore, ICTs help to relate academics to the practices of today's work. Information and communication technologies, especially network technologies have been found to encourage active learning, support innovative teaching, reduce the isolation of teachers, and encourage teachers and students to become active researchers and learners. They can also strengthen teaching through the provision of powerful tools for teachers (Cradler & Bridgforth, 2002).

ICTs can assist in reducing teachers' workloads through its use for lesson preparation and worksheet, writing students' report and individual education plan, collating and analysing students' attainment information for target setting; recording and analysing attendance and disciplinary information, and maintaining link between the school and parent to ensure parental involvement in school activities (British Educational Communications and Technology Agency, (BECTA, 2004). It can be used in getting

necessary instructional content of subjects, and collaboration can be ensured with teachers globally. In addition, teachers can also have up to date knowledge of a subject area and assist in students' development, for instance, the Internet. In the context of teachers' development, e-learning can be used for both initial and continuing development through courses, workshops, and other activities, formal and informal, where students and practicing teachers learn about integrating ICTs across the curriculum to support learning.

There are several global gateways of online resources to support teachers' development. These include: ICTs in Education, developed by UNESO, Paris; Education Network of Australia, developed by Education Institute, Adelaide; Institute of Educational Technologies in Education, developed by UNESCO, Moscow; and so on. These portals provide opportunities for users to ask questions, post materials, and submit assignments (Anderson, 2004). Also, ICTs will shift focus from teacher-centred to student-centred learning, where learners are active participants in the learning process, produces and share knowledge, and participate and learn in collaboration with others. Thus, teachers become learning facilitator, collaborator, coach, mentor, knowledge navigator, and co-learner and not only a dispenser of knowledge. In addition, ICT can be multi-media for instructional delivery. Instructional content can be delivered in text, audio, visual, and audio-visual forms. Thus, equity can be ensured for all categories of learners (disabled, geographically disadvantaged, those who cannot attend regular school, etc).

According to the 11th Edition of Global Information Technology Report (2012) Sweden occupies the top spot on global index with Mauritius ranking a distant 53rd as the best performing Sub-Sahara African Nation followed by South Africa 71st position and Nigeria comes at the 112th position. Other African countries like Rwanda 82nd, Botswana

89th, Kenya 93rd and Senegal 100th position. The report further states that African countries suffer from severe weaknesses in all components of the index from poor connectivity caused by expensive and poor-quality ICT infrastructure to very low levels of basic skills and weak framework for technology-niche activities to flourish. Most Nigerian tertiary institutions are already having computer study as part of their academic programmes, most of them are still theoretical in nature to impact meaningfully on the society. The National Universities Commission recently established a virtual learning website, but its impact is yet to be seen and it is too early to be assessed (Gbenga, 2006). In fact, ICT has had more impact on administrative services such as admissions, registration, fee payment and purchasing than on the fundamentals of classroom teaching and learning. But even if ICT has not revolutionized the classroom yet, it is changing the learning experience of students by relaxing time and space constraints as well as providing easier access to information, online journals and e-books; students' portals; etc an achievement that should not be downplayed (Gambari and Okoli, 2007)

However, Nigeria as a nation recognizes the pivotal roles of ICTs in the revitalization and the development of the country's education system. This recognition brought about the development of specific ICTs related policies so that the country's education system could husband the potentials of ICTs. The Minister of Communications Technology, in 2011, set up an Adhoc Committee to harmonize all the various policies for the different sectors in the ICT industry (Telecommunication, Broadcasting, Information Technology and Postal Services). The Federal Government had, in the last 10 years, in collaboration with UNESCO, initiated a number of programmes under the Virtual Institute for Higher Education Pedagogy (VIHEP) and the Virtual Institute for Higher Education in Africa (VIHEA) aimed at encouraging ICT-based education in primary, secondary and tertiary

levels of education through teacher training. In 2007, for instance, the Federal Government entered into a partnership with private sector agencies for the development of ICT resource centres in all the federal institutes across the country as part of efforts to ensure their sustainability.

The Federal Ministry of Education, through the National Universities Commission (NUC) and National Commission for Colleges of Education (NCCE), is also implementing the Virtual Library Project, while conducting capacity-building activities, as well as providing technical and logistics support to enable the universities and colleges of education to build their ICT capacities for staff and students use.

2.3 ICTs in Teacher Education

The need for the development of ICT is a global resolution and has been a subject of great significance to all mankind (Olaofe, 2005). These technologies have become central to contemporary societies. Whether one is talking on phone, sending an email, going to the bank, using a library, listening to sports coverage on the radio, watching the news on television, working in an office or in the field, going to the doctor, driving a car or catching a plane, one is using ICTs. Information and communication technology is a shorthand for the computers, software, networks, satellite links and related systems that allow people to access, analyze, create, exchange and use data, information and knowledge in ways that were almost imaginable (Association of African Universities, 2000). The prevalence and rapid development of ICTs has transformed human society from the information technology age to the knowledge age (Galbreath, 2006).

ICT has the potential to transform the way education is delivered and promotes new opportunities, therefore, enhancing scholarship and enquiries. This can only be attained when teacher Educators (Lecturers), who are still the key to learning, have developed and utilized the necessary pedagogical competencies for instructional delivery through ICT resource utilization. Jones (2003) observed that effective learning is dependent on the will and competencies of the teacher in the instructional delivery of lessons. This implies that teachers must undergo capacity building in ICT resources at the NCE and university level of education to enable them utilize maximally its benefit in instructional delivery.

Furthermore, ICT resources are instructional delivery tools used to explore, investigate, solve problems, interact, reflect reason and learn concepts in the classroom. This innovation permits alternative types of educational patterns for facilitating the teaching/learning process (Umoren, 2006). She conceptualized the ICT resources as the e-learning which is most commonly associated with higher education and corporate training that uses an information network through the internet, an intranet (LAN) or Extranet (WAN). Electronic learning (e-learning) is used both in informal and formal educational setting for facilitation, instruction, interaction and for instructional delivery. Web-based learning is also a subset of e-learning.

Another type of ICT resources is the virtual teaching which entails instructional delivery through teleconferencing the video conferencing technique. Web based instruction uses internet and the World Wide Web (WWW) as the major component of learning materials and instructional resources for effective instructional delivery. Audio media (instructional slides and tutorials) are teaching/learning resources made and written into compact disks, graphics and texts. Through the power point, instructional delivery is

impactful to slow and fast learners. The need to assess the involvement of teacher educators in FCE in the mind blowing programmes of ICT resources utilization has informed this research work.

2.4 Lecturers and Utilization of ICT in Content Delivery

ICT resources such as video content and digital movie making in laptop computing and hand held a technology has been used in the classrooms to support and enhance learning. Similarly, new uses of technology such as podcasting are constantly emerging (Marshall, 2002). To Marshall, various technologies deliver different kinds of content and serve different purposes in the classroom. Word processing and e-mail promote communication skills; database and spreadsheet programmes promote organizational skills; and modelling software promotes the understanding of Science and Mathematics concepts. It is important to consider how these electronic technologies differ and what characteristics make them important as vehicles for education (Becker, 1994).

Technologies available in classrooms today ranges from simple tool-based applications (such as word processors), to online repositories of scientific data. Others are primary historical documents, handheld computers, closed-circuit television channels, and two-way distance learning classrooms. Prensky (2005) asserted that even the cell phones that many now carry with them can be used to learn. Lei and Zhao (2006) observed that each technology is likely to play a different role in student learning. Rather than trying to describe the impact of all technologies as if they were the same, researchers need to think about what kind of technologies are being used in the classroom and for what purposes. Two general distinctions could then be observed from the literature. Students can learn from computers where technology is used essentially as tutors and serve to increase

student's basic skills and knowledge. Moreover, they can learn with computers where technology is used as a tool that can be applied to a variety of goals in the learning process and can serve as a resource to help develop higher order thinking, creativity and research skills (Reeves, 1998; Ring Staff and Kelley, 2002).

Murphy, (2001), observed that the primary form of student learning from computers is described as Discrete Educational Software (DES), integrated learning system (ILS), Computer-Assisted Instruction (CAI), and Computer-based Instruction (CBI). These software applications are also the most widely available applications of educational technology in schools today, along with word-processing software, and have assisted in the classroom for more than twenty years (Becker, Ravity and Wong, 1999). Murphy (2001) explains that teachers use DES not only to supplement instruction, as in the past, but to introduce topics, provide the means for self study, and offer opportunities to learn concepts otherwise inaccessible to students. The software also manifests two key assumptions about how computers can assist learning. First, the users' ability to interact with Information and communications technology specifically for teaching/learning purposes, while the ICTs in Education involves the adoption of the general components of information and communication technologies in the teaching learning process (Olakulehin, 2007).

Generally, however, the educational relevance of computers and other components of information technology cannot be overemphasized. Reference can be made in the period when skinner applied programmed instructions to teaching machines, through Brunner's experiment with computers in instruction, to the current wave of information transmission and exchange via the World Wide Web; we have seen different applications of ICTs in enhancing cognitive development. Thomas and Ranga in UNESCO (2004) in their classification divided the application of computers and other communication technologies

in education into three broad categories. These are: Pedagogy, Training and Continuing Education. The pedagogical applicability of the ICTs is concerned essentially with the most effective learning and with the support of the various components of ICTs. Almost all subjects ranging from mathematics (the most structured) to music (the least structured) can be learned with the help of computers.

Olakulehin (2007) emphasized that the pedagogic application of ICTs, involves effective learning with the resurces of computers and other information technologies, serving the purpose of learning aids, which plays complementary roles in teaching and learning situations, rather than supplements to the teacher/instructor/facilitator. The computer is regarded as add-on rather than a replacing device. The pedagogical uses of the computer necessitate the development, among teachers as well as students, of skills and attitude related to effective use of information and communications technologies. Aside of literacy, ICTs also facilitates learning to programme, learning in subject areas and learning at home on one's own, and these necessitate the use of new methods like modeling, simulation, use of data bases, guided discovery, closed-word exploration etc. The implications in terms of changes in the teaching strategy, instructional content, role of the teachers and context of the curricula are obvious as well as inevitable. Pedagogy through the application of information and communications technologies has the advantage of heightening the motivation; helping recall previous learning; providing new instructional stimuli; activating the learner's response; providing systematic and steady feedback; facilitating appropriate practice; sequencing learning appropriately; and providing a viable source of information for enhanced learning. Teachers who use this system of instructional strategy would be able to kindle in the hearts of the learners a desirable attitude towards information technology tools in their entire way of life.

2.4.1 Availablity, Accessiblilty and Lecturers Perception of ICT Resources

The efficacy of ICT in higher education has been proved beyond reasonable doubt. It has been known to enhance educational opportunities for individuals and groups constrained from attending traditional universities as well as the use of computers as tutors for drills and practice as well as instructional delivery (Umoren 2006). The unfortunate thing is that, ICT resources are beyond the reach of teacher educators and as such, they cannot access them for the purpose of instructional processes.

Cirfat, Zumyil and Ezema, (2003) assessed the adequacy, relevance, and utilization pattern of available ICT facilities in two Colleges of Education in Plateau State. The result of the study indicates that the status of ICT in the two Colleges of Education was below average. Very few ICT facilities were available. Apart from the computer department, none of the departments in the school of sciences possessed a computer, and any of its accessories. Busari (2003) carried out an investigation into the training status and ICT support of teacher trainers in institutions of higher learning in Lagos State. All the Colleges of Educations, Universities and Polytechnics in Lagos State formed the population of the study. It was found out that most teacher trainers had little ICT support from their employers and that the majority of them rarely applied ICT in instructional delivery.

A study carried out by Wisdom and Terumber (2012) examined ICT resource utilization, availability and accessibility by teacher educators in the College of Education (COE) Katsina-Ala. The study revealed that ICT resources were not available in COE Katsina-Ala for teacher educators' instructional development; Teacher educators in COE Katsina-Ala could not access ICT resources for instructional development purposes. The study also shows that ICT resources were not available in COE Katsina-Ala. The institution

did not supply computers to its lecturers, many of them owned personal laptops and desk top computers which were not connected to the internet and as such could not access internet services in their offices for instructional preparations. They mostly relied on personal mobile devices to access the internet.

Similarly, Ajayi (2008) observed that there were no functional ground internet facilities in most of the tertiary institutes in Nigeria. This appears to hinder the extent of teacher educators' exposure to the use of ICT in instructional delivery. Teachers as well as students appear not to be knowledgeable in the use of ICT because there appears not to be any official training for both the teachers and the students in school. It has also been observed by (Ajayi, 2008) that most tertiary institutions lack computer literate teachers; irregular power supply appears to thrive in the institutions. Moreover, it seems the institutions could not purchase enough computers for use because of inadequate funding. Besides, the non proper inclusion of the ICT programmes in the curriculum of Nigerian educational system seems to be another major challenge facing the adoption of ICT in teacher training institutions.

Not much was found on studies available on ICT availability and accessibility in Colleges of Education by teacher educators but the studies cited here were done in secondary schools by Idoko and Ademu, (2010), both found out that ICT availability often been one of the most important obstacles to technology adoption and integration in learning. They indicated that there is an urgent need for more computers if a country is to successfully integrate ICT in public secondary schools.

Odogwe (2000) had conducted a study to find out Science, Technology and Mathematics (STM) teachers' competence in the use of the computer, as a tool for enhancing

STM instruction and learning in Secondary Schools. From the analysis of the results, 21% of the teachers were not computer literate at all, while 79% were computer literate. The analysis also revealed that 16% of teachers in the sample occasionally used computer in their schools. These findings indicate that even though many teachers are computer literate but the teachers were not applying computer in their teaching. Iji (2000) also examined the level of acceptability, effectiveness, and attitudes of mathematics teachers towards computer utilization in the teaching of mathematics in secondary schools. The result of the study revealed that computer could be used in the teaching of mathematics generally. It also revealed that the computer is a good instructional tool for the teaching of three dimensional problems as earlier discovered by (Etukudu, 1995).

Dogara, Ahmadu, and Lawal, (2003) also conducted an investigation into the use of ICT in teaching and learning of Science, Technology and Mathematics (STM) in six selected Secondary Schools in Kano Metropolis. The findings of the study revealed that about half of the STM teachers were Information Technology (IT) literate but very few used ICT in their teaching. It was also discovered that ICT resources were available but inadequate and inaccessible to STM teachers and students.

Adeyebe, Oke and Tijina (2003) conducted a research on the feasibility of teaching and assessing STM with ICT resources in Nigeria. They sought to find out the level of availability and capacity development of ICT in teaching and assessing STM in Nigeria, and when exactly should Nigeria adopt ICT in teaching and learning STM. The results of the study indicate a very low availability of ICT resources in the sampled schools although eighty percent (80%) of the respondents both teachers and students indicates their willingness to be trained for ICT usage. This corroborated the low level of capacity development for computer

use in teaching and assessing STM subjects. From the free comments of the respondents, it was apparent that there was an eagerness to understand the usage of the computer for teaching and assessing STM subjects. The researchers expressed a high hope for the adoption and integration of computer in the teaching and assessing STM in Nigeria.

Ezeoba (2007) carried out an investigation of ICT availability in schools in Onitsha on 100 nursery school teachers which revealed that the media availability average was less than 20% over 50%. It also found out that the degree of utilization in instructional delivery was that teachers mostly used books and over 60% did not use ICT resources at all. Idoko and Ademu (2010) in an investigation of the challenges of ICT for teaching/learning as perceived by agricultural science teachers in 210 secondary schools from the three educational zones in Kogi State also found that ICT facilities were not available in secondary schools.

Similarly, Fakeye (2010) also investigated the English language teachers' knowledge and use of ICT in Ibadan Southwest LGA of Oyo State and found that availability of computers and their connection to the internet was non-existent in virtually all the schools studied. Utilization, which is dependent on availability, was poor therefore, usability was also found to be poor.

Studies have established positive attitude among educators towards computer education in Nigeria. For instance, Yoloye (1990) in his finding revealed that lecturers at the University of Ibadan have positive perception and attitude towards computer and, in fact, would like to be trained to use it. Similarly, most teachers in Nigerian Secondary Schools have a positive attitude towards computer education (Yusuf, 1998). However, empirical studies have established that lecturers level of use of computer is very low at the University of Ibadan (Yoloye, 1990) and that wide gap exists between implementation and requirements

outlined in the Nigerian Computer Education Policy (Jegede & Owoli, 2003).

In addition, reasonable computer studies are yet to start in Nigerian Secondary Schools. The computer-student ratio is small and funding by the government has not been encouraging. The computer education syllabus is unpopular among students and parents thus, hardly implemented, and teachers are inadequate to implement computer education (Jegede & Adelodu, 2003). Teachers in Nigerian secondary schools cannot implement computer education because majority of the teachers are not competent in basic computer operation and in the use of simple application software (Yusuf, 2005b).

Several studies have indicated the academic benefit of ICTs in education. Meta analyses have found consistently positive and moderately high achievement gains at all educational levels from computer mediation in school subjects, particularly mathematics. The computer-assisted Instruction was found more effective in all educational levels and with lower achieving students (Kulik, 1983; Kulik, Kulik, & Cohen, 1980). Information and Communication Technologies significantly improve students' problem-solving skills, provide opportunities for student-constructed learning, increase students' collaboration on projects, increase mastery of vocational and workforce skills, increase the preparation of students for most careers and vocations, and improve confidence and attitude of students (Cradler & Bridgforth, 2002). It must be underscored that the best predictors for achievement gain in the use of computer were prior positive attitudes towards the technology by teachers and students, consistent access to the technologies, and teacher training in the technology, among others (Maldonado, 2000).

Olatokun (2007) studied research collaborators of 102 lecturers in Nigerian university and reported that publication activities of lecturers were greatly enhanced by the

use of e-mail, file/document exchange, dissemination of results and data collection. Benefits derived from e-mail use include its flexibility, ensuring easy link with peers and colleagues, easy of file/document exchange privacy and confidentiality of information and its distance friendliness were collectively contributed to productivity of research collaboration.

Voorbij and Ongering (2006) carried out a five years survey among faculty members in the Netherlands to examine their experience with electronic journal. The study was performed in two parts using two methods. In the first part, they sent an online questionnaire to a sample of 750 faculty members, employed at nine universities in 2003/2004. The response rate was 40.7 percent. In the second part, semi structured questionnaire interviews were conducted with twenty two respondents to further explore some of the issues raised in the questionnaire. They summarized the result as follows: electronic journals are strongly accepted in Netherlands in particular by scientist and social scientists and have tremendous impact on their research work.

Going through research studies in overseas countries, Mahajan (2005) revealed the ICT utilisation by researchers in Punjah University, Chandegarh, which analyzed the technology that have transformed society into a knowledge society. It was stated that the Internet is considered to be the most valuable of all computer technology. Also, Mulla and Chandrashekara (2006) conducted a study on Internet users of Mysore University. The study was conducted using faculty students and lecturers in different science subjects. The study revealed that a majority of the lecturers used the Internet and were satisfied with the information available. Majid (2000) carried out a study on the utilization of Internet by

library professionals in Malaysian academic libraries and reported that the Internet contributed positively to reference work and enhanced their effectiveness and efficiency.

In view of evolving nature of the ICTs (Ehikhamenor, 2002) emphasized that the Internet is indeed changing the ways in which lecturers seek information, communication with each other, conduct research and distribute research results. Ojedokun and Owolabi (2003) investigated Internet access, competence and utilization of Internet for teaching and research activities by University of Botswana lecturers and reported that the respondents used Internet facilities for literature searching and to improve their teaching of students. In addition, Leiner, Cerf, Clark, Kahn, Kleinrock, Lynch and Wolff (2000); Singh (2002) observed that the Internet provides several opportunities for the lecturrs. It is a mechanism for information dissemination and a medium for collaborative interaction between individuals and their computers without regard to geographic limitation of space.

However, some criticisms arose on the utilization of the Internet. Some see it as a research tool with sheer volume of randomly distributed materials, but with difficulties in accessing or locating specific information. This is like trying to find a needle in a haystack. Search engines help to solve this problem, but they have limitations. Search engines cannot, for example, help you choose an appropriate keyword for a search - a crucial skill when carrying out Internet research. Considerable thought must go into picking words or phrases that are fairly unique to your subject, or you will find that a search brings up lots of "bad hits," or inappropriate references. No matter the difficulties in getting information from the Internet or achievement through Internet browsing, success ultimately depends on the interplay of lecturers' commitment (high self-efficacy) and the built up potentials to accomplish their goals.

Although some scholars have a distinct view of computer networking and concluded that it reduces scientific productivity, most especially in developing countries because of the learning cost it involves before becoming proficient. No matter what, it has not underscored the enormous information availability on the Internet. Day and Bartle (1998) and Nentwich (2003) perceived that the Internet create information overload, excessively broad hits on web-based information search costs as well as create a retrogressive impulse in achieving technological benefits. In addition, the unsolicited e-mail not related to work issues cluttering mailboxes also constitute time wasting and stand as a bottleneck on Internet use whilst viruses distributed over the Internet can destroy data. The possibilities of accessing information on computer networks might have a distracting effect and could increase "the amount of time spent fooling around" (Walsh and Roselle, 1999).

However, recent studies in Nigeria indicated that much work has not been down in the aspect of ICT utilization and research productivity. This could be attributed to the fact that information technology is yet to takes it stand in developing countries. Ehikhamenor (2003) studied the utilization of Internet information by Nigerian scientists in 10 universities and observed that scientists in Nigeria still heavily depend on printed information sources.

2.5 Perception of ICT by Nigerian Women Educators

While considering the use of ICTs by teacher educators, the studies of (La Valle and Blake, (2001) have noted that there is a disparity in the use of ICT between males and females. Writers such as Hafkin and Taggart (2001) note that factors which affect the use or non-use of ICTs by the male may actually be different from those that affect the use or non-use by female. That is what makes it important to study gender differentials in ICT adoption and use because the technology is not gender neutral. It is the widespread beliefs that female are lagging behind male when it comes to the accessibility, availability and utilization of ICTs.

Hafkin and Taggart (2001) identified factors such as literacy and education, language, time, cost, and geographical location of facilities, social and cultural norms, as well as female's computer information and dissemination skills as constraints against women's access to information technology. The questions then are: Why are female affected by these factors? what can be done to improve their access, availability and utilization of ICT?

Hafkin (2002) observed that gender issues in ICT policy fall into two categories. In the first category, there are gender issues that affect nearly all aspects of access. Secondly, there are gender issues in the topics that classically arise in ICT policy. The first category of gender issues that results in differential access and impact of the new technologies on male and female have been articulated in many places and with numerous variations, but the majority among them are discussed below:

(a) Physical Access to Infrastructure

Technological infrastructure is a gender issue. At present, a huge gender gap exists in access to communications; infrastructure is concentrated in urban areas, and the bulk of women live in rural areas (Hafkin, 2002). In developing communications infrastructure, many choices must be made that involve the location of facilities, cost and choice of technologies. All of these affect the majority of female, who are poor and living in rural areas in most African countries, to access these facilities. Hafkin (2002) reported that Internet connectivity is frequently available only within capital and major secondary cities in many developing countries, while the majority of the population lives outside these cities. Access to communication facilities is a vital concern that affects women's lives.

The infrastructure deficit of the rural areas coincides with gender demographics- more female live in rural areas than men. Simply by being the majority of the population in rural areas, women have a smaller chance than men to access new technologies. Female, with their special responsibilities for children and the elderly, find it less easy than men to migrate to towns and cities. Urban bias in connectivity thus deprives female, more than men, of the universal right to communicate (UNIFEM and UNU/TECH, 2000).

(b) Social and Cultural Issues

Hafkin (2002) also reported that female tend to have less access than men to available ICT facilities. Frequently, rural information centers or cybercafés are located in places that female may not be comfortably frequenting. Since most communication facilities in rural areas are public access, women also have problems of time. Given multiple roles and heavy domestic responsibilities, their leisure hours are few, and the centres may not be open when women can visit them. Or they may be open in the evenings, when it is problematic for

women to visit them and return safely to their homes in the dark. Their mobility (both in the sense of access to transport and the ability to leave the home) is also more limited than that of men.

Some accommodations that may be needed to ensure gender equality in access and use of ICTs are adaptation of schedules to suit women's hours and availability of women support staff and trainers. In addition to this, Hafkin (2002) stated that another cultural aspect of gender and ICTs is gender bias in attitudes towards female studying or using information technology. The problem is worse in many African countries than in other countries in other parts of the world. Many (predominantly male) math, science and technology teachers in Africa hold outmoded views that females cannot think or work scientifically and that science is too mechanical and technical for females, thus discouraging female students from enrolling in technical courses (Quaisie, 1996).

Attitudes that information technology is not for women are not limited to formal education. In an ICT project for farmers in Cajamarca, Peru, when women undertook information technology training with male, the male mocked them, saying that computers are for men, not women (Puican 2002). Sometimes collateral cultural factors and other cultural attitudes based on gender bias, and not the immediate gender identification of technology use, prevent young girls and women from accessing and using ICTs.

In Uganda, girls did not get access to the limited number of computers installed in school because of the socio-cultural norm that "girls do not run" (Gadio, 2001). As a result, the boys ran and got to the computers first and refused to give them up to girls. Additionally, the earlier curfew hours for girls at boarding schools, further constrained their access to computers. In India, in the well-known "hole in the wall" experiment, the

aggressiveness of boys pushing away girls prevented the girls from using the computers (Mitra, 2001).

(c) Education and Skills

These involve literacy, language, computer skills and information literacy. In each case, female in developing countries are less likely than men to have the requisite education and knowledge. Two-thirds of the world's 876 million illiterates are females, and the number of illiterates is not expected to decrease significantly in the next twenty years (UNIFEM, 2000). Females are also less likely to know the international languages that dominate the World Wide Web. Until two years ago, the Internet was predominantly in English. But in 2002, the percentage fell rapidly to the point where English is no longer the primary language of the majority of Web users. After English, most Web pages are in Chinese, Japanese, German, languages and women in poor countries are unlikely to know. Given their limited access to schooling, women, especially those in rural areas, are also much less likely than men to have computer skills.

Information literacy essentially involves using information contextually, a skill that women are less likely than men to have (Heeks, 1999). This generally results from the limited exposure and isolation of many women in developing countries, particularly those living in rural areas.

(d) Financial Resources

Almost all communication facilities are expansive. Women are less likely than men to own computers and television sets, or to access them whenever they want to for their home use. When it involves paying for information access, such as at a rural information centre or a cyber cafe, women are either less likely to have the disposable income to do so, or hesitate to

use family food, education and clothing resources for information. According to Hafkin (2002), there are gender issues in the way that ICTs are used in developing countries. To date, most women's use of ICTs has been confined to email and sometimes to lesser (email discussion lists), generally in connection with advocacy and networking activities.

The main reasons for this concentration are cost of access and limitations of time, bandwidth and technical skills. Few women have used it for business, entertainment (the predominant use in the developed world) or education, including education in matters related to livelihood and well being of themselves and their families (e.g. Health and nutrition education). A number of the factors above fall into the category of financial and educational deficits in accessing and using ICTs.

2.6 Status of ICTs in the Nigerian Education System

Nigeria as a nation has recognized the potentials of information and that of information and communication technology in the school system. This is evident in the educational reform policies aimed at integrating the use of ICT, particularly the computer, in the Nigerian school system. The first national programme was the Federal Government (1988) policy document, National Policy on Computer Education (FME, 1988). The document emphasized the need for primary school pupils to be introduced into basic computer skill, the use of the computer to facilitate learning, and rudimentary use of text writing, computation and data entry. For secondary schools the goals were as identified in primary schools, but to be pursued at a higher level. The additions were the organization of curriculum for secondary school students on computer education, and the decision to use the unity schools as the pilot institutions for computer education.

The tertiary institutions were also required to teach computer science as a subject discipline, and also integrate it in school administration and instruction. Other components

of the document include; equipment requirement, teacher training, and specific recommendation on different tertiary institutions. However, as noted earlier, the implementation was not effective. The National Policy on Education (FRN), as revised in (1998) and (2004), re-emphasized the need for the integration of ICT in the Nigerian education system. For instance, the (2004), 4th edition, again emphasized the need for the introduction of information and communication technology into the school system. This is an acceptance of the need to go beyond computer to the level of ICT, and also the need for corresponding infrastructure.

The first holistic attempt at introducing ICT in all facets of the country's life was the approval by the Federal Government of a national policy on ICT. The Nigerian national policy for information technology (FRN, 2001), recognised the need for ICT to be used for education, and three major objectives among several objectives emphasised the need to: empower youths with ICT skills to prepare them for competitiveness in a global environment, integrate ICT into the mainstream of education and training, and establishment of multifaceted ICT institutions as centres of excellence on ICT. The document specifically noted the need for "Restructuring the education system at all levels to respond effectively to the challenges of the information age and in particular, the allocation of a special IT development fund for education at all levels". To achieve these objectives, nine major strategies were outlined, these include: making the use of ICT compulsory at all educational institutions, development of ICT curricula for all levels of education, using ICT in distance education, and ICT companies' investment in education.

Others include giving study grant and scholarship on ICT, training the trainers' scheme for Youth Corp members on ICT, ICT capacity building in the zone, state, and local government levels, establishing private and public dedicated ICT institutions, and working

with international and domestic initiatives to transfer ICT knowledge. However, Yusuf (2005b) noted in his analysis of the Nigerian National Policy for information technology (FRN, 2001) that the policy was inadequate for positive impact on the Nigerian education system. This, he noted, stems from the fact that the philosophical frame of reference is market driven, and that there is little emphasis on the integration of ICT in instruction. It should be noted that none of the policy documents, national policy on computer education (FME, 1988), national policy on education (2004), and the Nigerian national policy for information technology (FRN, 2001), recognised the need to use the computer or ICT to provide access to education for people with disability.

This underscores a major inadequacy in the policy document. In addition, the strategies outlined in the document were not followed. Another significant document on ICT was the Federal Ministry of Education (FME, 2004) Ministerial Initiative on e-Education for Nigerian Education System. Unlike the previous documents, the initiative was drawn based on input from major educational and human development commissions and board (National Universities Commission, National Colleges of Education Commission, National Board for Technical Education, Education for All, Universal Basic Education, etc.). Also, for the first time, the need to integrate ICT in special education, particularly for people with disability was emphasized.

However, the document could not be implemented because the Minister who initiated the document was removed. Thus, signaling the death of the document which was meant to leapfrog the Nigerian educational institutions into ICT compliant ones. Since then, no national document had been developed for the integration of ICT in Nigerian educational institutions.

2.6.1 ICT Policies in the Nigerian Education System

As noted earlier, the implementation of the 1988 National Policy on Computer Education was precursory by the training of teachers in Federal Unity Schools and Armed Forces Schools. To ensure effective implementation of the (2001) National Policy, Information Technology (IT), the Nigerian Information Technology Developments Agency (NITDA) was established. In addition, the Digital Bridge Institute, in Abuja, was established by the Nigerian National Communication Commission (NCC), to assist in the promotion of ICTs in Nigeria. In spite of all these efforts, ICTs has not impacted greatly on the Nigerian School System. In fact, the impact of ICT is much more noticeable in the economic and communication sectors of the country.

Although computer entered into the country's education system in the late 70's and early 80's, no concrete policy was evolved for its entry into the nation's education system until the involvement of the National Policy on Computer Education in 1988 (Federal Republic of Nigeria, FRN, 1988). The 1988 document contained information on the application of computer at various levels of the country's education, and with issues related to basic objectives, hardware and software requirements. The document also comments on teacher training, specifically, for the secondary school level. The implementation of the policy started with a training programme conducted for 197 teachers from across the country. In addition, computer systems were introduced into the federal unity schools and armed forces secondary schools. However, the initial enthusiasm gave way and little was achieved about the set objectives.

The further impetus for ICT integration in the Nigerian school system came with the 2001 National Policy on Information Technology, tagged "Use IT". It was a major step in

the integration of ICT in all facets of the country's life. The document, among others, recommended a start up grant of at least $158m and two percent allocation for the total national budget for articulating the vision of the document. The Nigerian National Policy for IT (FRN, 2001) has within its purview the vision, mission, general objectives and strategies for the implementation of the policy, and pectoral application for all sectors (health, agriculture, tourism, etc.) was also embedded. Ironically, education was subsumed under human resource development. The document, in the areas of education, among others, envisaged the development of IT curricula for all levels of Nigerian education, the facilities, and IT dedicated institutions.

Although the document is a step in the right direction, however, it is inadequate to impact positively on the Nigerian education as the philosophical frame of reference is market driven and its little emphasis on the real integration and infusion of ICTs in the country's education system (Yusuf, 2005a). In addition, the document was silent on the education of the disabled and other disadvantaged. The revised National Policy on Education (FRN, 2004) emphasized the need for ICTs at all levels of Nigerian education. For instance, the document stated inter alia in Section 11 sub-section 102 (a) that "All states, Teachers Resource Centres, University, Colleges of Education, and other professional bodies shall belong to the network of Information and Communication Technology. The document noted further in Section 11 sub-sections 102 (d) "Government shall provide facilities and necessary infrastructure for the promotion of Information and Communication Technology at all levels of education". Another major aspect of the document that is ICT relationship is the national virtual library project aimed at the rejuvenation of the Nigerian schools through provision of easy access to current books, journals, and other information resources using digital technology (FRN, 2004). It must be

emphasized, however, that little or no efforts have been made to implement the ideas set out in these 2001 and 2004 documents.

Another major policy document on ICTs use in education is the Ministerial Initiative on Education for the Nigerian Education System (Federal Ministry of Education, FME, 2004). The document contains information on the theoretical framework for e-education in Nigeria, analysis of the Nigerian situation, that is, factors inhibiting or promoting the integration of ICTs in education, components of e-education in Nigeria, e-education blueprint, elements of the blueprint strategies, decade goals (2015), mid-decade goals (2009) and the action plan, among others. The ministerial initiative document though not encompassing enough to address ICTs integration in Nigerian schools, contained policy statements, which could leapfrog the integration of ICT in Nigerian schools. However, the removal of the Minister of Education who initiated the document, probably accounts for non-implementation of the document.

2.6.2 ICTs in the Implementation of the Nigerian Educational Reforms

The potentials of information and communication technology to improve the quality of instruction, transform the school, improve school management, increase access to education and improve in teacher education, among others, have been emphasized in several studies. Information and communication technology has the potential for enhancing the tools and environment for learning as it: allows materials to be presented in multiple media, motivates and engages students in the learning process, fosters inquiry and exploration, and provides access to worldwide information resources, among others (Haddad, 2003). However, researches have been inconclusive on the expectations regarding

the value of ICT (Carnoy, 2004; Trucano, 2005). The educational reform act of 2007 (FME, 2007) clearly highlighted the need to: improve the quality of instruction in Nigerian school, provide enriched learning environment, need to provide more access to education, and provide the students with knowledge and skills necessary for the 21st century workplace, among others, as the motivating factor for the educational reforms. It must be underscored that information and communication technologies will assist in ensuring achievement of these goals of the educational reforms.

In specific terms, manpower that is competent and constantly given developmental training will be required for the success of the reforms. First, ICT can be relevant in the teachers' professional development, to make them guides to sources of knowledge. Teachers in contemporary knowledge society require large, rich, and easily accessible-knowledge base which can be provided through ICT technologies that support teacher professional development (Gallimore and Stigler, 2003). Teachers need to be lifelong learners to keep abreast of new knowledge, pedagogical ideas, and technology (World Bank, 2003), relevant to successful implementation of Nigerian educational reforms. Through the digital libraries, virtual institutions, and other Internet resources teachers can easily have access to relevant and current resources in their areas. Thus, they must be the use of ICT to husband its potentials. Secondly, the quality of students' learning will be enhanced through their access to the needed content through ICT facilities (especially, the Internet). Information and communication technology can enhance learning by doing, and increase the information available to learners, thereby engendering collaborative learning (World Bank, 2003).

Information and communication technology can also empower the learners with information technology awareness and skills which are essential for success in the contemporary knowledge economy (Kante, 2003). ICT provides new frontiers for providing access to basic education for disadvantaged children and youth excluded from the formal school system. As modern ICT is attractive to children and youth, they provide unmatched learning opportunities for them to learn within and outside the formal school system. They are powerful motivational tools for learning through games, exploration, collaboration, and learning work-related skills (Fillip, 2002). Distance learning is enhanced through ICT and can provide flexible learning opportunities with collaborative aspects and rapid communication among learners and between the learners and academic mentors (World Bank, 2003). Also, ICT can provide opportunities for individuals with disabilities to have access to quality education, (one of the basic goals of the Nigerian educational reform). They can be relevant as assistive technology, adaptive technology, and as a tool for knowledge and support (Jurich and Thomas, 2002). Assistive ICT encompasses not only computerised technologies but also a powered wheelchair with voice command and other computer technologies which can increase mobility for persons with severe neuromuscular limitations. Adapting ICT include keyboards with colourful keys for persons with learning disabilities, voice recognition, and the accessible web accessibility option initiative of the W3 Consortium which are designed to provide web access for people with disability. Thus, ICTs is opening new doors for people with disability to have enhanced access to education in conventional and distance education settings (Jurich and Thomas, 2002).

Evaluation of education reform implementation is essential at the macro and micro

levels of the Nigerian education system. At the macro level, educational reform implementation is evaluated at the national level in terms of wholesome national objectives. At the micro level, educational reforms are evaluated at the institutional or school level. The evaluation is based on the institutions' needs, objectives, and resources. At the micro level, reform is evaluated in the classroom in terms of the available resources, how often these resources are utilized, and the level of achievement of educational goals and objectives. Information and communication technology can assist in evaluation at these levels in several ways. One of the basic problems affecting educational reforms in Nigeria is the problem of centralized database on implementation and networking of research efforts. Through ICTs research, results of educational institutions can be centralized and disseminated for national or specific contextual application. In addition, information and communication technologies are essentials in the sensitization of Nigerians, particularly educational stakeholders on the nature and aspects of the educational reforms, the resources and needs for its proper implementation, and the evaluation of the reforms, among others. It is possible to promote institutional linkages, collaboration between various stakeholders, and dissemination of information on educational reforms through ICT.

Information and communication technology, on their own, cannot ensure the success of the Nigerian educational reforms. These potentials of the ICT in the implementation of the Nigerian educational reforms are only possible through adequate planning and proper integration. That is why; Aniebonam (2007) offered ten major interventions which, he believed, would assist in integrating ICTs in driving educational reforms in Nigeria. These are provision of infrastructure (cyber centres, classroom building, offices, etc.), institutional network (LAN, WAN, WiFi), systems and applications (Internet, e-learning, education portals, etc.), capacity building, digital library, technical support in institutions, computer

ownership scheme (for students, teaching and non-teaching staff), ICT content career development scheme, International Examination Digital Centre (IEDC) and continuous power supply. Intervention programmes on ICTs capacity building as being currently done by the Education Trust Fund and the Digital Bridge Institute, Abuja, should be strengthened. In addition, academic and non-academic staff members at the lower levels of the country's education system should be involved in such capacity building. It should be underscored that necessary stakeholders should be involved in the development of ICT software with local contents to ensure the domestication of ICT within the Nigerian school system.

For instance, the curriculum specialists recommended that there is the need for computer education to be included in the basic education programmme as a core subject and not as an elective subject (Obioma and Ajagun, 2006). Finally, a certain percentage of the national budget should be set aside to promote ICT in the Nigerian school system, as outlined in the 2001 Nigerian national policy on information technology.

2.7 Lecturers' Perception about the Factors Affecting the Use of ICT in Content Delivery

Preston and Cox (1999), summed up that there are a number of factors which have been identified which might influence and support teacher educators in using ICT in the classroom. In order to investigate these factors further in relation to teachers' ICT use, the study makes use of the Technology Acceptance Model TAM developed by Davis, Bagozzi and Warshaw (1989) which was an adaptation of the theory of reasoned action by Ajzen and Fisbein (1980) to investigate the reasons why teachers uses ICTs. Their model links the perceived usefulness and ease of use with attitude towards using ICT and actual use (system use). They tested this model with 107 adult users, who had been using a manageable system for 14 weeks. They found that people's computer use was predicted by

their intentions to use it and that perceived usefulness was also strongly linked to these intentions. Davis (1989) has also found that there is a relationship between users' beliefs about a technology's usefulness and the attitude and the intention to use the technology. However, perceived usefulness exhibits stronger and more consistent relationship with usage than did other variables reported in the literature. In addition, an individual may adopt a technology if he or she perceives it as convenient, useful and socially desirable, even though they do not enjoy using the technology (Saga & Zmud, 1994). Thus, there might be a possibility of a direct relationship between beliefs and intentions.

Although these have been identified as very important by a number of research studies, leading teachers to understand the need for change and to question their professional practice, discussed earlier, only a few could be investigated within the scope of this project. The main focus of this research is how teachers perceive ICT's contribution to teaching and learning. These factors come within perceived usefulness and perceived ease of use components.

2.7.1 Empirical Studies on Lecturers' Perception Using ICT

Olufunde, Oyetola and and Kehinde (2010) in their study on access and utilization of ICT among lecturers and students in South-west Nigerian public universities found that 89% of the respondents claimed to have never or rarely had access to ICT facilities. They found that lecturers were very low in their knowledge and proficiency in the use of ICT facilities. Ololube, (2006) studied on the teacher instructional materials utilization competencies in secondary schools in sub-Sahara Africa found that teachers are not well trained in using ICTs in teaching as a means for educational sustainability, and that the level of the teachers' exposure to the tool of ICTs has been very minimal.

Similarly, Onasanya, Shehu and Oduwaiye (2010) studied and found that the level of competences and skill acquisition of colleges of education and polytechnics lecturers in the use of ICT facilities and equipment is worrisome in Nigeria. Hogarty and Kramer (2000) found that academic qualifications of lecturers do not affects lecturers' attitudes towards the use of ICT facilities and equipment. It is surprising that the younger lecturers are more amiable to new challenges than the old ones.

However, recent studies in Nigeria indicated that much work has not been down in the aspect of Internet utilization and research productivity. This could be attributed to the fact that information technology is yet to takes it stand in developing countries. Ehikhamenor (2003) studied the utilization of Internet information by Nigerian scientists in 10 universities and observed that scientists in Nigeria still heavily depend on printed information sources.

Nweke (1993) studied the use of information source by pre- clinical faculty members of the Maiduguri Medical College**.** The study found that the use of personal record data and other information sources vis-à-vis Internet enable the pre-clinical faculty members of the college to meet their information needs of keeping up-to-date with their respective responsibility of teaching, research and public services. He further found that, the Internet is also suitable for meeting the information needs of medical practice, patient education and specialized patient care.

Ibegwan (2002) posited that health information can be accessed directly through the medical website known as MEDLINE, which has been described as "one of the jewels of

medical research". The results indicated that use of electronic information contribute immensely to the academic performance of the health workers.

Oduwole (2004) carried out a research to examine the utilization of Internet facilities and its impact on the research outputs of agricultural scientist at the University of Agriculture, Abeokuta, Nigeria during the 2001/2002 academic session. Analysis of the responses showed that about half (54 per cent) of the agricultural researchers at the university use the yahoo search engine and that they spend an average one hour per day browsing the Internet. The study also revealed that respondents use the Internet to find research materials such as journals and conference proceedings, followed by sending and receiving of electronic mails (e-mail). The study concludes that the use of the Internet for academic research by Agricultural Scientist has improved their research output.

Olatokun (2007) studied research collaborators of (102) lecturers in Nigerian university and reported that publication activities of lecturers were greatly enhanced by the use of e-mail, file/document exchange, dissemination of results and data collection. Benefits derived from e-mail use include its flexibility, ensuring easy link with peers and colleagues, easy of file/document exchange privacy and confidentiality of information and its distance friendliness were collectively contributed to productivity of research collaboration.

Previous studies into teacher use of ICTs have identified staff development as one of the contributing factors in using ICT effectively in the classroom. McCarney (2004) gave a report on an investigation into effective staff development in ICT for teachers.
A sample of Scottish primary school teachers has been surveyed to investigate the impact of different models of staff development in ICT on the teacher and to explore the

knowledge and skills gained by teachers for staff development: technical; academic/content-related; pedagogy. The results indicate the need for a much greater emphasis to be placed on the pedagogy of ICT. This should be of interest to all involved in teacher education and the continuing professional development of teachers.

UNESCO, (2004), in a study of primary school teachers that focused on pedagogy using ICT, showed that the most successful teachers were those who used examples and counter examples and involved students in explaining and modeling in the class. Teachers who favoured ICT were likely to have well-developed ICT skills and to see ICT as an important tool for learning and instruction. They were also likely to value collaborative working, inquiry and decision making by students. Teachers' pedagogical approaches are in turn affected by a number of key factors. First, they are affected by knowledge about their own subject. There is a clear distinction between teachers who choose ICT resources to fit within a particular topic and those who choose resources merely to present pupils' work in a new way, without any direct application to the topic. The evidence shows that when teachers use their knowledge in both the subject and also how students understand the subject with their use of ICT have a more direct effect on students' attainment. Cox, (1999) report findings of a small project funded by the Teacher Training Agency and Oracle through the Miranda Net project, set up to investigate the factors which have contributed to the continuing use of ICT by experienced ICT and ICT teachers in their teaching. Evidence has been collected through a literature search, teacher questionnaires, teachers' reports and interviews. The factors which were found to be most important to these teachers in their teaching were: making the lessons more interesting, easier, more fun for them and their pupils, more diverse, more motivating for the pupils and more enjoyable.

Additionally, more personal factors were improving presentation of materials, allowing greater access to computers for personal use, giving more power to the teacher in the school, giving the teacher more prestige, making the teachers' administration more efficient and providing professional support through the Internet. Gray and Souter (2004) in a study of secondary science teachers use of ICT conducted in America focuses on the data from one aspect of the use of ICT in secondary subject areas, and the perceptions of teachers in these areas. A comparism of science teachers' perceptions is made by teachers from other disciplines.

Although the responses of biology teachers could be analysed, the numbers in the study were quite small overall so a general view is taken across the three science disciplines of biology, chemistry and physics. Examination of the data indicated that, relative to other subject teachers, science teachers came out positive with regard to use of and confidence in ICT. However, in absolute terms, although the availability of computing facilities was reportedly quite high, the actual level of use was quite low.

In addition, where level of use was higher, it was with regard to a rather narrow range of applications, particularly word-processing. In addition, little was reported in the way of pupil use of ICT in science classes. Although there appeared to be an awareness of the potential for ICT in science, teachers indicated that they did not see the introduction of ICT radically changing the way in which teaching took place, nor changing the teacher-student relationship. Science teachers were reasonably confident in their use of ICT but felt that they needed much more in the way of support and professional development to maximise their use of ICT in the classroom.

The Gordon University Aberdeen (2004) in a study conducted in Scotland on teachers' ICT skills and knowledge need reported that the use of ICT is relatively low and

is focused on a fairly narrow range of ICT. Word processing is the predominant use made of ICT in primary and secondary schools. There is some use of externally produced educational software in both sectors and secondary teachers tend to use a broader range of generic packages such as spreadsheets and desktop publishing (DTP) than do primary teachers. There is very little use of the Internet and World Wide Wave or e-mail by either primary or secondary teachers, despite the fact that the majority of secondary schools have access to the Internet. Resources such as video conferencing and network computer conferencing are rarely used.

The study further revealed that secondary teachers use ICT primarily to support classroom practice; post secondary teachers use it as much or more for professional development and personal use as in the classroom. Teachers are using ICT throughout the curriculum, but use and attitude vary in secondary schools between subject areas. Mathematics and science teachers use ICT relatively little while, amongst non-computing teachers, ICT are used mostly by teachers of business and management subjects. Having reviewed relevant literature on this study, the focus still remains to examine the teachers' perception on ICT facilities usage from a population of Federal Colleges of Education teachers where study of this nature has just begun to emerge.

2.8 Limitations of ICT Use to Lecturers in Content Delivery

ICT as a modern technology that simplifies and facilitates human activities is not only advantageous in many respects, but also has many limitations. Many people from within and outside the education system, think of ICT as "Panacea" or the most important solution to school problems and improvements. However, many conditions can be considered as limitations of ICT use in education. The limitations can be categorized as teacher related, student related, and technology related. All of them potentially limit the

benefits of ICT in education. Lecturers' attitude play an important role in the teaching-learning process in the utilization of computers and internet connections. Although teachers' attitude towards the use of these technologies is vital, many observations reveal that teachers do not have clarity about how far technology can be beneficial for the facilitation and enhancement of learning.

Of course, some lecturers may have positive attitudes to the technology, but refrain from using it in teaching due to low self-efficacy, tendency to consider themselves not qualified to teach with technology. In this respect, Bandura (1986) describes self-efficacy as "individual's opinion of capabilities to organize and perform courses of actions to achieve particular types of performances." Moreover, as identified by Brosnan (2001), attitude, motivation, computer anxiety, and computer self-efficacy are factors affecting teachers' use of computers in their lessons. Teacher resistance and lack of enthusiasm to use ICT in education may also be another limitation.

Furthermore, many teachers may not have the required Information Technology skills and feel uncomfortable, nor do they have trainings needed to use the technology in their teaching. Unless teachers develop some basic skills and willingness to experiment with students, ICT use in education is at a disadvantage (Brosnan, 2001). Similarly, the limitation of ICT use in education is also related to students' behaviour. Appropriate use of computers and the internet by students have significant positive effects on students' attitude and their achievement. Nevertheless, it is very common to observe limitations related to students' behavior because they tend to misuse the technology for leisure time activities and have less time to learn and study. Yusuf (2008) described online gaming, the use of face book, chat rooms, and other social networks as perceived drawbacks of ICT use in education, because, students easily switch to these sites at the expense of their study. Internet access at home, for

instance, may be a distraction because of chat rooms and online games, reducing the time spent in doing assignments and learning (Kulik, 1994).

Therefore, the impact of availability of ICT on students' learning strongly depends on its specific uses. If ICT is not properly used, the disadvantage will overweight the advantage. For example, while students use the internet, it may confuse them by the multiplicity of information to choose from. As a result, the teacher spends much time to control students from websites unrelated to the learning content.

Accordingly, computers limit students' imaginations. Over-reliance on ICT limits students' critical thinking and analytical skills and students often have only a superficial understanding of the information they download. Computer-based learning has negative physical side-effects such as vision problem; students may be easily distracted from their learning and may visit unwanted sites. They may tend to neglect learning resources other than the computer and internet and focused on superficial presentations and copying from the internet. They may have less opportunity to use oral skills and hand writing, use of ICT may be difficult for weaker ones, because they may have problems with working independently and may need more support from the teacher. The other limitation of ICT use in education is technology related. The high cost of the technology and maintenance of the facilities, high cost of spare parts, virus attack of software and the computer, interruptions of internet connections, and poor supply of electric power are among the technology related limitations of ICT use in education (Ezeliora, 2003). Various studies have shown the multifaceted problems militating against the effective use of ICT in the teaching-learning process in education. These include: irregular power supply (Yusuf, 2005; Ofodu, 2007); inadequate computer literate teachers (Oyebanji, 2003, Kwache, 2007) inadequate fund (Ogunmilade, 1988, Nwite, 2007); the reluctance of teachers to new changes (Selwyn, 1997) among others.

2.9 Summary

In this chapter, issues like Information and Communication Technology, lecturers' instructional development using ICT resources and ICT resource available and accessible to lecturers in colleges of education in Nigeria were discussed. Thus, the literature review provids information on the perception of ICT by Nigerian women educators, the status of ICT in Nigerian education system, ICT policy in Nigeria, factors affecting teachers in using ICT as well as ICT limitations.

Most of the empirical studies reviewed share the conviction that the accessibility of ICT resources for content delivery could be of help to lecturers. According to International Labour Organization (1995) accessibility begins with availability. Therefore, by virtue of the relevance of ICT in content delivery, it becomes necessary to make ICT resources available in colleges of education to enhance effective instructional processes. From the review of literature, it is clear that several studies found that ICT resources are not available and accessible by lecturers in colleges of education in Nigeria. Studies have also shown that lecturers are not well expose and proficient in the use of ICT resources in teaching/ learning activities.

However, very few of the literature reviewed sought to find out lecturers qualification and their perception of ICT availability, accessibility and utilization in content delivery in FCE. This study is designed to fill this gap in the literature so as to provide useful information in such area.

CHAPTER THREE

RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes the method, procedures and techniques used in the conduct of the study. Specifically, it discusses the research design, population, sample and sampling technique, instrumentation, validity of the instrument, pilot testing and reliability of the instrument, procedure for data collection, as well as procedure for data analysis.

3.2 Research Design

This study adopted survey research design. A survey is used in studies that have individuals as units of analysis (Babbie, 2001). This is also what Nworgu (1991) described as allowing a group of people or items to be studied by collecting and analyzing data from only a few people or items to be considered as representative of the entire group.

It allows the researcher to gather information about a target population without undertaking a complete enumeration. It is a research method that is good for both small and large population and it is a common research method in social Science (Hale, 2011). The choice of this design was to allow the researcher to gain an insight of the feelings, opinions, awareness and appreciation of lecturers towards ICT resources in content delivery.

3.3 Population

The population of this study comprises of all the lecturers in Federal Colleges of Education in Nigeria. The lecturers are spread across the six geopolitical zones of the country. They consisted of Three thousand six hundred and thirty five (3,635) male lecturers and one thousand four hundred and thirty six (1,436) female lecturers. Therefore there were Five Thousand and Seventy One (5,071) male and female respondents. Their distribution is presented in table 3.1 as follows:

Table 3.1 Distribution of Federal Colleges of Education and Lecturers in Nigeria based on Geopolitical zones

NORTH CENTRAL	**Female**	**Male**	**TOTAL**
FCE OKENE	61	201	262
FCE PANKCHIN	93	256	349
FCE KONTAGORA	42	142	184
GRAND TOTAL	**196**	**559**	**795**
NORTH EAST	**F**	**M**	**TOTAL**
FCE T GOMBE	65	236	301
FCE T POTISKUM	47	193	240
FCE YOLA	56	154	210
GRAND TOTAL	**168**	**583**	**751**
NORTH WEST	**F**	**M**	**TOTAL**
FCE KANO	84	179	263
FCE T GUSAU	36	135	171
FCE KATSINA	46	171	217
FCE T BICHI	52	172	224
FCE ZARIA	209	346	555
GRAND TOTAL	**427**	**1003**	**1430**
SOUTH EAST	**F**	**M**	**TOTAL**
ALVAN IKOKU COE OWERRI	61	140	201
FCE T UMUNZE	77	65	142
FCE EHA-AMUFU	60	129	189
FCE T OMUKU	43	151	194
GRAND TOTAL	**241**	**485**	**726**
SOUTH SOUTH	**F**	**M**	**TOTAL**
FCE T ASABA	55	81	136
FCE OBUDU	62	235	297
GRAND TOTAL	**117**	**316**	**433**
SOUTH WEST	**F**	**M**	
ADEYEMI COE ONDO	65	223	288
FCE ABEOKUTA	81	139	220
FCE SP OYO	85	177	262
FCE T AKOKA	56	110	166
GRAND TOTAL	**287**	**649**	**936**

Source: National Commission for Colleges of Education (NCCE), 2011.

3.4 Sample and Sampling Technique

A sample size of eight hundred and forty three (843) lecturers was used in this study. A number of sampling techniques were used in the selection of the sample. In the first place cluster sampling technique was used to cluster the Colleges of Education into six geopolitical zones of Nigeria (North East, North West, North Central, South West, South East and South-South) respectively. Also, simple random sampling was used to select one college from each cluster. Thereafter, Krejcie and Morgan statistical table was used to obtain the proportion of the respondents from the sample frame as presented in table 3.2 below. The choice of the six Federal Colleges of Education is based on the researchers' desire to spread the samples across a wide range of coverage. The distribution of the sample size is presented in table 3.2 as follows:

Table 3.2: Distribution of Sample from the Population of Federal Colleges of Education in Nigeria

S/N	Name of Colleges	Sample Frame	Sample Size
1	F. C. E. T. Asaba	136	103
2	Adeyemi COE Ondo	288	165
3	F. C. E. Katsina	217	140
4	F. C. E. Okene	262	155
5	Avan Ikoku COE Owerri	201	132
6	F. C. E. Yola	240	148
	TOTAL	**1344**	**843**

3.5 Instrumentation

The instrument for data collection was a modified questionnaire. A questionnaire tagged Teachers ICT usage survey from the ICT Survey Indicator for Teachers and Staff developed by both UNESCO (2004) and New Zealand Ministry of Education (MINEDU) (1999) was adapted in this study. It was designed under Seven (7) different sections and

harmonized in one single questionnaire; Section A required the respondents' demographic information that includes: Sex and Qualification of the respondents, while Section B - G contains 61 items on "Assessment of availability, accessibility and utilization of ICT resources in content delivery among lecturers in Federal Colleges of Education in Nigeria" as against 32 items developed by UNESCO (2004) and New Zealand Ministry of Education (MINEDU) (1999).

It was also designed on a three point Likert scale type in which the respondents will choose from the options provided. The Respondents were required to respond to the items by a tick (√) against the appropriate option that reflect or show their personal opinion as seen in appendix I.

3.5.1 Validity of the Instrument

The content validity of the instrument was ascertained by giving the questionnaire to two specialists in the field of educational technology and one from measurement and evaluation. The judgment and assessment of the specialist helped to determine the extent to which the items of the questionnaire accurately cover the area of the study domain. As Nworgu (1991) states that validating an instrument requires the services of a panel of experts who ensure that the items correspond with the purpose of the study, research questions as well as hypotheses if any to be tested. This was to determine by the experts on whom items can actually elicit the information from the questionnaire intends to elicit in order to answer the research questions of the study.

3.5.2 Pilot testing

Twenty (20) copies of the questionnaires were pilot tested in Federal College of Education, Kano to ascertain the reliability of the instrument. In the process of pilot testing, some problems were encountered and noticeable among was that some words used are

vague. This was overcome by replacing those words based on the respondents' level of understanding. It was also discovered that in some section of the instrument, rating items do not meet the international benchmark hence, was increased to meet the standard format. The data collected were analyzed with the Statistical Package for Social Science.

3.5.3 Reliability of the Instrument

The Cronbach's Alpha Reliability Coefficient was used to obtain the reliability coefficient of the instrument. The reliability co-efficient of 0.96 was obtained. This is also what Fulekar, (2009) says that an instrument is said to be reliable when the reliability co-efficient can be approximated to one (1). Thus, this instrument can be said to be satisfactory for use in the study. The choice of this statistical method was informed by its advantage of non multiple administrations of instruments. The method did not require the splitting of items into two halves and sub-scores to obtain a reliability Coefficient.

3.6 Procedure for Data Collection

The researcher obtained an introductory letter from the Department of Educational Foundations and Curriculum, A.B.U Zaria, which was used to facilitate the ease of the administration of the questionnaires in the respective colleges. Upon obtaining colleges consent, the researcher solicited the help of research assistants.

After the initial introduction and briefing in respect of the purpose and nature of the research questionnaires, the research assistants were required to administer it to the participants as well as ascertain that they were duly returned by the respondents. The help of colleagues in each of the colleges was sought to supervise and complement the effort of the assistants.

Some of the research assistants hold a Masters' degree, while others are Bachelors of Education degree holders. One thousand (1000) copies of the research questionnaires was administered to the lecturers in the six selected colleges. However, only Eight Hundred and Ten (810) were returned, thirty copies were invalid, while Seven Hundred and Eighty (780) copies of research questionnaires were used for the analysis.

3.7 Procedure for Data Analysis

In view of the nominal, ordinal and interval data generated from the research questionnaires, a number of statistical techniques were used for the analysis. Frequency counts and percentage were used to explain the demographic data of the study. Frequency count was also used to answer research questions 1-6. Descriptive statistic using the mean and the standard deviation was used to answer research questions 7and 8.

In addition, t-test independent was used to answer hypothesis 1. The mean scores and standard deviation of male and that of female lecturers' view of ICT availability, accessibility and utilization in content delivery were computed to arrive at the decision. ANOVA was also used to answer hypothesis 2 and the respondents' views based on their qualifications were computed using sum of square, degree of freedom, mean of sum of square and tested at 0.05 level of significance.

CHAPTER FOUR

DATA PRESENTATION AND ANALYSIS

4.1 Introduction

This chapter presents the results of the data obtained from the study. The analyses of the data were based on the research questions and the null hypotheses advanced in chapter one. The results obtained from the data collected for this study are presented in the following tables:

4.2 Demographic data of the respondents

Table 4.2.1 Frequency and percentage distribution of the respondents by gender

Respondents	Frequency	Percentage
Male	511	65.50%
Female	269	34.50%
Total	**780**	**100.00%**

The data in table 4.2.1 shows that out of 780 respondents; Five and Eleven 511 (65.50%) are male while Two Hundred and Sixty Nine 269 (34.50%) are female. This means that the male lecturers form the majority of the respondents that took part in the study.

Table 4.2.2 Frequency and percentage distribution of the respondents by Qualification

Qualifications	Frequency	Percentage
B. ED	102	13.15
B.Sc (Ed)	44	5.64
PGDE	60	7.70
M.Ed	372	47.70
Ph.D	82	10.51
Others	120	15.38
Total	**780**	**100.00**

The data in table 4.2.2 shows that 372 (47.70%) of the respondents who took part in the study are M.Ed holders, followed by others 120 (15.38), next is B.Ed 102 (13.15%),

followed by Ph.D 82 (10.51), PGDE 60 (7.70) and the least is B.sc (Ed) 44 (5.64) respectively.

4.3 Research Questions

Research Question 1: Which types of the ICT resources are available to lecturers in content delivery in Federal Colleges of Education in Nigeria?

To answer this question, respondents were asked to rate the ICT resources that are available in their colleges and utilised in content delivery. This was to identify the types of ICTs that are available to lecturers in their colleges on a three point scale. Item 5 – 14 of the research instrument was used to answer this question. The result is presented in the table 4.3.1 as follows:

Table 4.3.1 Lecturers' response on the available ICT resources used in content delivery

Rating items	Available	Fairly Available	Not Available	Total
Computer hardware	284	298	440	780
Computer software	54	60	666	780
Integrated services digital network	31	44	705	780
Fiber optics connection	31	44	705	780
Smart board	214	263	303	780
Learning management system	9	28	743	780
Servers/Hubs	9	28	743	780
Data projector	98	131	569	780
Digital camera	88	74	618	780
T V/ Radio	176	248	356	780

Table 4.3.1 showed that the number of lecturers who indicated that ICT resources are fairly available and not available is more than those who indicated that ICT resources are available on all items. This means that majority of lecturers in FCE are of the view that ICT resources are not available. This might be due to the non provision of the ICT resources by the school management or the government.

Research Question 2: which forms of the ICT resources do lecturers have access to and used in content delivery in Federal Colleges of Education in Nigeria?

To answer this question, respondents were asked to rate themselves on the items provided on ICTs accessibility in content delivery. The purpose was to ascertain the type of ICTs that are accessible and used by the lecturers in content delivery. Item 15 – 24 of the research instrument were used to answer this question. The result is presented in the table 4.3.2 as follows:

Table 4.3.2 Lecturers' response on the accessible ICT resources used in content delivery

Rating items	Accessible	Fairly Accessible	Not Accessible	Total
Computer hardware	284	298	440	780
Computer software	54	60	666	780
Fax machine	28	32	720	780
Word processing	158	260	362	780
Smart board	140	236	404	780
Scanning machine	85	120	575	780
Internet browsing	58	62	660	780
Data projector	98	131	569	780
Digital camera	88	74	618	780
T V/ Radio	176	248	356	780

Table 4.3.2 showed that the lecturers who indicated that ICT resources are fairly accessible and those indicated not accessible are more in number, then those lecturers who indicated that ICT resources are accessible on the questionnaire. This result shows that the majority of lecturers in FCE does not have access to ICT resources in content delivery. This might be because their schools are not connected to the internet.

Research Question 3: How proficient lecturers are on the of use ICT resources in content delivery in Federal Colleges of Education in Nigeria?

To answer this question, respondents were asked to rate themselves on the items provided on the perceived proficiency of utilising ICT resources in content delivery. The purpose was to find out how proficient lecturers are in the utilization of ICTs in content delivery. Items 25 – 34 of the research instrument were used to answer this question. The result is presented in table 4.3.3 as follows:

Table 4.3.3 Lecturers'response on the perceived proficiency of using ICT resources in content delivery

Rating items	Proficient	Fairly proficient	Not proficient	Total
Using ICT in content delivery	54	82	644	780
Using ICT to conduct research	245	267	268	780
Using ICT to assess students' performance	243	261	276	780
Using ICT to keep students' records	245	267	268	780
Using ICT to prepare lesson notes	40	236	404	780
Using ICT to present instructional materials	85	120	575	780
Using ICT to motivate students' learning	58	62	660	780
Using ICT to impact learning on students	61	78	641	780
Using ICT to control students' learning	39	53	688	780
Using ICT to make lesson presentation more interesting	30	48	702	780

Result in table 4.3.3 showed that the number of lecturers who are fairly proficient and not proficient on the items on perceived proficiency in using ICT resources in content delivery is greater than the number of those that are proficient on all items. This means that most of the lecturers in FCE are not proficient in the use of ICT resources in content delivery.

Research Question 4: How do the lecturers perceived the usefulness of ICT resources in content delivery in Federal Colleges of Education in Nigeria?

To answer this question, respondents were asked to rate themselves on the items provided on the perceived usefulness of ICT resources in content delivery. The purpose was to find out how lecturers perceived the usefulness of ICTs in content delivery on a three point scale. Item number 35–44 of the research instrument were used to answer this question and the result is presented in the table 4.3.4 as follows:

Table 4.3.4 Lecturers' response on the perceived usefulness ICT resources in content delivery

Rating items	Useful	Fairly useful	Not useful	Total
ICT helps in making teaching-learning more interesting.	524	163	94	780
ICT helps in distance learning programme.	504	175	106	780
ICT enhances quality of work of the lecturers.	511	140	106	780
It makes lecturers to be up-date in their various disciplines.	498	210	72	780
ICT help reduces examination malpractice in administration.	480	189	111	780
ICT enhances efficiency of work.	530	183	67	780
It improves quality of teaching.	528	177	75	780
It enhances the management of financial records.	488	180	112	780
ICT reduces lecturers' workload.	540	130	110	780
ICT enhances collaboration among lecturers in getting instructional content of courses globally.	450	120	210	780

Table 4.3.4 showed that the lecturers that perceived the use of ICTs in content delivery positively on all the items are more in number than their counterpart. The results indicate that majority of the lecturers who took part in the study perceived the use of ICTs as very useful in content delivery.

Research Question 5: What is the level of the lecturers' exposure to ICT resources in content delivery in Federal Colleges of Education in Nigeria?

To answer this question, respondents were asked to rate themselves on the items provided on the level of exposure to ICT resources in content delivery. Item number 45 – 54 of the research instrument were used to answer this question and the result is presented in table 4.3.5 as follows:

Table 4.3.5 Lecturers' response on the perceived exposure in using ICT resources in content delivery

Rating items	Exposed	Fairly Exposed	Not Exposed	Total
Social media network services	521	134	125	780
e-mail	379	267	134	780
Search engines	489	193	98	780
e-learning	325	210	245	780
Invisible websites	70	206	404	780
World wide web (www)	558	162	60	780
Online database	58	62	660	780
Subject directory	61	78	641	780
Skills to use ICT	139	161	480	780
Periodic training organized for teachers on the use of ICTs.	140	195	460	780

The result in table 4.3.5 showed that 521 lecturers are exposed to social media network services. This is greater than the number of those fairly exposed 134 and not exposed 125. The result also shows that 558 lecturers are exposed to the World Wide Web and this outnumbered those fairly exposed 162 and not exposed 60. Furthermore, the result shows that 325 lecturers are exposed to e-learning and this is more than the number of those fairly exposed 210 and not exposed 245. It is also shown from the table that 489 lecturers are exposed to search engines, while 193 and 98 lecturers were fairly and not exposed. Additionally, 379 lecturers are exposed to e-mail, while 267 and 134 are fairly and not expose to e-mail.

Furthermore, 70 lecturers are exposed to invisible websites and contrarily, 206 and 404 lecturers are fairly and not exposed to invisible websites. The result on the table further indicate that only 58 lecturers are exposed to online databases, while 62 and 660 are fairly

and not exposed to the online database. Although, the results indicate that lecturers are exposed to very few resources in their content delivery.

Research Question 6: What are the challenges lecturers faces in the use of ICT resources in content delivery in Federal Colleges of Education in Nigeria?

To answer this question, respondents were requested to indicate on the challenges they face in the use of ICT resources in content delivery. The purpose was to find out the challenges being faced by lecturers in the utilization of ICTs in content delivery on a three point scale. Items 55 – 65 of the research instrument were used to answer this question and the result is presented in table 4.3.6 as follows:

Table 4.3.6 lecturers' response to the perceived challenges of using ICT resources in content delivery

Rating items	Not Challenged	Fairly Challenged	Challenged	Total
Lecturers' inadequate ICT skills	114	263	403	780
Lack of confidence in using ICTs	245	267	268	780
Lack of knowledge of how to evaluate the use and role played by ICT in teaching and learning	616	78	86	780
Insufficient knowledge of appropriate software	497	201	82	780
Poor infrastructures	40	236	504	780
Insufficient time to make use of computers	575	120	85	780
Irregular power supply	32	58	690	780
Inadequate facilities to support the full application of ICT	61	76	643	780
Non inclusion of ICT programmes in teachers' training curriculum	39	53	688	780
Inadequate fund	398	243	139	780
The cost of purchasing computers	319	266	195	780

Table 4.3.6 shows that most of the respondents indicate that inadequate ICT skills, poor infrastructures, irregular power supply, inadequate facilities to support the full application of ICT are the most serious challenges hindering their use of ICT in teaching. The result also shows that those lecturers who indicated that lack of knowledge of how to

evaluate the use and role played by ICT in teaching, insufficient time to make use of the computer and inadequate fund as challenges in using ICTs are less in number. Generally the result shows that the greater numbers of lecturers in FCE are faced with serious challenges in dealing with ICTs in content delivery.

Research Question 7: How do the perceptions of male lecturers differ from that of female lecturers on ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria?

In response to research question 7, item number 5-24 and 35-44 of the research instrument was computed to determine the mean and standard deviation of male and female lecturers and the result was presented in table 4.3.7 as follows:

Table 4.3.7: Descriptive Statistics for Gender difference in respect of ICT availability, accessibility and utilization

Gender	N	Mean	Std. Deviation
Male	511	72.95	22.00
Female	269	66.22	22.82

Table 4.3.7 shows at a glance that the mean difference between the female and male lecturer's view of ICT availability, accessibility and utilization is very significant with the mean score and standard deviation for male lecturers as 72.95 and 22.00 respectively, while the female lecturers being respectively 66.22 and 22.82. The mean and standard deviation indices as shown in Table 4.2.1 above are indication that there was complete heterogeneity in the responses of female and male lecturers on ICT availability, accessibility and use.

Research Question 8: How do lecturers' qualifications influences their perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria?

In response to research question 8, the responses on item number 5 – 24 and 35 -44 of the research instrument was computed to determine the mean and standard deviation of lecturers views based on their qualifications. The result is presented in table 4.3.8 as follows:

Table 4.3.8 Descriptive statistics for differences in respondents' view on ICT availability, accessibility and utilization with respect to Qualifications

Qualification	N	Mean	Std. Deviation
B.Ed	102	70.41	21.00
B.sc (Ed)	44	66.39	25.25
M.Ed	372	71.25	20.69
PGED	80	67.59	21.22
PhD	82	75.05	23.40
Others	120	65.08	27.25
Total	**780**	**68.57**	**22.75**

The result from table 4.3.8 shows that lecturers with Ph.D had the highest level of perception of 75.05, followed by M.Ed lecturers with mean perception of 71.25, next are those lecturers with B.Ed with the mean perception of 70.41, PGED with the mean perception of 67. 56, B.sc (Ed) has the mean perception of 66.39, while others had the least mean perception of 65.08 respectively. This implies that lecturers' qualification significantly influences their level of perception of ICT availability, accessibility and utilization in content delivery in FCE.

4.4 Hypotheses Testing

Ho_1: There is no significant difference between male and female lecturers' perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria.

To test this hypothesis, t-test statistics for independent sample on the difference between male and female lecturers' perception of ICT availability, accessibility and utilization was used to present the result in table 4.4.1 as follows:

Table 4.4.1: t-test Statistics for Gender Difference on ICT Availability, Accessibility and Utilization

Gender	N	Mean	Std. Deviation	Df	t-value	p-value	Decision
Female	269	66.22	22.82	779	3.97	0.000	Reject H_o
Male	512	72.59	22.00				

Table 4.4.1 shows the t-test comparison of male and female lecturers' perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria. The calculated t-value (3.963) is higher than the critical p-value (0.000). This indicates that there is a statistical significant difference in the perception of male and female lecturers at 0.05 level of significance. Therefore, going by the decision rule, $H0_1$ was rejected. Hence there existed a significant difference between female lecturers and female lecturer's perception on ICT availability, accessibility and utilization.

HO_2: There is no significant difference between lecturers' qualification and their perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria.

To test this hypothesis, One Way ANOVA was used on the differences between lecturers' qualifications and their perception of ICT availability, accessibility and utilization as presented in table 4.4.2 as follows:

Table 4.4.2 ANOVA Statistics on Availability, Accessibility and Utilization of ICT Resources by Lecturers

Groups	Sum of Squares	Df	Mean Square	F	p-value	Decision
Between Groups	6248.76	5	1249.75	2.44	.033	Reject H_o
Within Groups	396926.23	774	512.83			
Total	**403174.98**	**779**				

Table 4.4.2 indicates the result of ANOVA in respect to hypothesis The result revealed that the calculated ANOVA significant value of .033 is lower than 0.05 alpha level of significance, just as the calculated F value 2.437 is higher than .033 critical values at degree of freedom 5, (774). Therefore, going by the decision rule, null hypothesis which state that there is no significant difference between lecturers' qualification and their perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education in Nigeria is therefore rejected. Hence the result revealed that significant differences exist in lecturers' perception of ICT availability, accessibility and utilization in content delivery by FCE on account of their academic qualifications.

4.5 Summary of Major Findings

The summary of the major findings are as follows:

1. The study revealed that ICT resources like computers, smart boards, data projectors, digital camera, fax machines, television, radio, etc are fairly available in Federal Colleges of Education in Nigeria.
2. It is also revealed from the study that majority of lecturers in Federal Colleges of Education do not have access to and do not utilised basic ICT resources like computers, smart boards, data projectors, digital camera, fax machines, etc in content delivery.

3. The study shows that most of the lecturers in Federal Colleges of Education are not proficient in the utilization of ICT resources to conduct research, assess students' performance and delivery instruction due to lack of exposure.
4. It is revealed that Federal Colleges of Education lecturers who took part in the study perceived the use of ICTs as very useful in their teaching, specifically in improving and enhancing the quality of their teaching. They also indicate that ICT helped in reducing examination malpractice, enhances efficiency of work and reduces their workload.
5. Despite the usefulness of ICT resources as perceived by Federal Colleges of Education lecturers, yet they are not well exposed to ICT resources like invisible websites,online database, subject directory, etc in content delivery.
6. The study also revealed that lecturers in Federal Colleges of Education are faced with serious challenges in the utilization of ICTs resources in their teaching. Such challenges includes; inadequate ict skills, poor infrastructures, irregular power supply and inadequate facilities to support the full application of ICT etc.
7. The study revealed that significant difference exist between male and female lecturers' perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education.
8. It is also shows from the study that lecturers' qualification significantly influences their level of perception of ICT availability, accessibility and utilization in content delivery in Federal Colleges of Education.

4.6 Discussion of Findings

The Lecturers' response on the available ICT resources used in content delivery, the findings of the study show that the number of lecturers who indicated that ICT

resources are fairly available and not available is more than those who indicated that ICT resources are available. This means that ICT resources like computers, internet, smart boards, data projectors, digital camera, fax machines etc are fairly available in Federal Colleges of Education in Nigeria. This finding agrees with the finding of Wisdom and Terumber (2012) which revealed that ICT resources were not available in College of Education (COE) Katsina-Ala for teacher educators' instructional development; Teacher educators in COE Katsina-Ala could not access ICT resources for instructional development purposes. This may be due to the non provision of the ICT resources by the school management or the Government.

Similarly, the result of the findings of Cirfat, Zumyil and Ezema, (2003): in Colleges of Education in Plateau State on the adequacy, relevance, and utilization pattern of available ICT facilities is the same as the finding of this study. The result of the study indicated that ICT resources were below average and very few ICT facilities were available. This study confirmed Idoko and Ademu (2010), both of them asserted that ICT availability often been one of the most important obstacles to technology adoption and integration in learning. They indicated that there is an urgent need for more computer literate teachers if the country is to successfully integrate ICT in schools.

On the frequency of accessibility of ICT resources by FCE lecturers, the result shows that the lecturers who indicated that ICT resources are fairly accessible and not accessible are greater than those lecturers who indicated that ICT resources are accessible. This result shows that most lecturers in FCE do not have access to ICT resources like computers, internet, smart boards, data projectors, digital camera, fax machines etc. This might be because their schools are not connected to the internet. Similarly, Lawal, Ahmadu, and

Dogara (2003) in their study on the use of ICT in teaching and learning of Science, Technology and Mathematics (STM) in six selected Secondary Schools in Kano Metropolis. The finding of their study revealed that ICT resources are not accessible to STM teachers and students because they are not available.

This also confirmed the finding of Olufunde, Oyetola and Kehinde (2010) on access and utilization of ICT among lecturers and students in South-west Nigerian public universities that 89% of the respondents claimed to have never or rarely had access to ICT facilities. This study also confirms the finding that availability usually determines accessibility. If ICTs are available, this will motive the lecturers to access them than when they are not available or available but not in sufficient quantity.

On the finding of this study in respect of how proficient lecturers are in the use of ICT resources in content delivery, results shows that the number of lecturers who are fairly proficient and not proficient on all the items is greater than the number of those that are proficient on all items. This means that most of the lecturers in FCE are not proficient to utilised ICT resources to conduct research, assess students' performance and delivery instruction. This might be due to lecturers' inadequate ICT skills. The finding of this study thus confirmed the proposition of Yusuf (2005b) that the majority of the teachers in Nigerian Secondary Schools are not competent in basic computer operation and in the use of simple application software. The finding of this study in this regard also corroborates with the findings of Olufunde, Oyetola and Kehinde (2010) on access and utilization of ICT among lecturers and students in South-West Nigerian universities that lecturers were not proficiency in the use of ICT facilities.

The finding of this study with regard to lecturers perceived usefulness of ICT resources in content delivery. The results of the study revealed that lecturers who perceived

the use of ICTs in content delivery positively are more in number than those who perceived it negatively. The results indicate that majority of the lecturers who took part in the study perceived the use of ICTs as very useful in their teaching, specifically in improving and enhancing the quality of teaching. They also indicate that ICT helped in reducing examination malpractice, enhances efficiency of work and reduces their workload. This finding did not contradict the finding of Yoloye (1990) which revealed that lecturers at the University of Ibadan have positive perception and attitude towards computer and, in fact, would like to be trained to use it. Similarly, this finding is in consonance with that of Yusuf, (1998) which revealed that most teachers in Nigerian Secondary Schools have a positive attitude towards using computer in education.

The result in respect to the level of lecturers' exposure to ICT resources in content delivery shows that (521) lecturers are exposed to social media network services. This is greater than the number of those fairly exposed 134 and not exposed (125). The result also shows that (558) lecturers are exposed to the World Wide Web and this is greater than those fairly exposed (162) and not exposed (60). Furthermore, the result shows that (325) lecturers are exposed to e-learning and this is more than the number of those fairly exposed (210) and not exposed (245). It is also shown from table 4.3.5 that (489) lecturers are exposed to search engines, while (193) and (98) lecturers were fairly and not exposed. Additionally, (379) lecturers are exposed to e-mail, while (267) and (134) are fairly and not expose to e-mail.

However, 70 lecturers are exposed to invisible websites and contrarily,(206) and (404) lecturers are fairly and not exposed to invisible websites. The result also indicated that only 58 lecturers are exposed to online databases, while(62) and (660) are fairly and not exposed to the online database. Furthermore, the results indicate that lecturers are

exposed to very few resources in their content delivery. This also agreed with the findings of Ololube (2006) in his study on the teacher instructional materials utilization and competencies in secondary schools in sub-Sahara Africa, where explained that lecturers are not well trained in using ICTs in teaching as a means for educational sustainability, and that the level of the teachers' exposure to the tool of ICTs has been very minimal. Similarly, the finding of this study is in consonance with that of Onasanya, Shehu, Oduwaiye and Shehu (2010) that the level of competence and skill acquisition of colleges of education and polytechnics lecturers in the use of ICT facilities and equipment is discouraging.

On the finding of this study with regard to the challenges lecturers faces in the use of ICT resources in content delivery, the results indicated that inadequate ICT skills, poor infrastructures, irregular power supply, inadequate facilities to support the full application of ICT are the most serious challenges being faced by lecturers in the use of ICT in content delivery. The result also shows that very few lecturers indicate lack of knowledge of how to evaluate the use and role played by ICT in teaching, insufficient time to make use of the computer and inadequate fund as challenges in using ICTs. Although, the result shows that the majority of lecturers in FCE are faced with serious challenges in dealing with ICTs in their teaching. This finding support Yusuf (2005a) and Ofodu (2007) who submitted that irregular power supply in the country is a major obstacle to the use of ICT in education. Marshall, Elgort and Mitchell, (2003) reported that teachers continue to identify a lack of time as a barrier to the use of technology. Previous survey of academic staff attitudes to the use of technology has also repeatedly identified time and an absence of such as ICT skills and knowledge as significant barriers to technology adoption (Marshall, 2000).

With regard to the null hypothesis which states that there is no significant difference between male and female lecturers' perception of ICT availability, accessibility and utilization in content delivery in Federal College of Education in Nigeria. The t-test comparison shows that the calculated p-value of (3.963) is higher than the critical p-value of (0.000) at 0.05 level of significance. This indicates that there is a statistical significant difference in the perception of male and female lecturers. Therefore, going by the decision rule, hypothesis one was rejected. Hence there is a significant difference between male lecturers and female lecturer's perception of ICT availability, accessibility and utilization.

This result is in agreement with the finding of Atan (2002) which found gender differences in the availability of computers, either at home or at workplace for distance education learners. This finding also confirms previous studies that reported continued gender differences of ICT access between male and female lecturers. This corroborates the Gender Advisory Board of the Commission on Science and Technology Development 2006 report that women's double and triple workloads of domestic, income-generation and community management activities mean that they often do not have the free time to travel, to learn about and use ICT. Furthermore, this finding was at variance with some findings which reported no gender differences with regard to ICT availability and accessbility. For instance, in the United States School-Sector, a 2001 study (Miller, Schweingruber and Brandenburg, 2001) found no gender difference in home computer ownership, and an extensive and recent study of United Kingdoom youth commented, "interestingly, gender makes little difference to access in any location" (Livingstone, Bober and Helsper, 2005).

Null Hypothesis two which states that there is no significant difference between lecturers' perception of ICT availability, accessibility and utilization in content delivery based on their qualifications. ANOVA statistics was used compared the difference between

lecturers' qualification and their perception of ICT availability, accessibility and utilization. The result revealed that the calculated ANOVA significant value of.033 is lower than 0.05 level of significance, just as the calculated F value 2.437 is higher than .033 critical values at degree of freedom 5, (774). Therefore going by the decision rule, null Hypothesis two was rejected. Hence the result revealed that significant difference exists in lecturers' perception of ICT availability, accessibility and utilization in content delivery on account of their academic qualifications. The finding of this study is at variance with the position of the findings of Hogarty and Kramer (2000) and Agbatogun (2006) in Onasanya, Shehu, Oduwaiye and Shehu (2010) which showed that academic qualifications of lecturers do not affect their attitudes towards the use of ICT facilities and equipment. Similarly, it is surprising that the younger lecturers are more amiable to new challenges than the older ones. This might be as a result of the revolution in educational technology and advancement.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

This chapter presents the summary of the study, the summary of the major findings of the study, implications of the findings to education, conclusion and useful recommendations. It also suggests areas for further studies, generalization and limitations of the study.

5.2 Summary

The main aim of this study is to assess the availability, accessibility and utilization of ICT resources in content delivery among lecturers in FCE in Nigeria. The objectives of this study, research questions and research hypotheses were drawn based on the major variables as outlined in chapter one of this study. This study covered six (6) Federal Colleges of Education in Nigeria. The colleges include FCE Asaba, Adeyemi College of Education Ondo, Alvan Ikoku College of Education Owerri, FCE Katsina, FCE Okene and FCE Yola. It was specifically targeted on the perception of lecturers on ICT resources, availability, accessibility, usefulness, proficiency, exposure and challenges in content delivery. Most of the review of related literature and empirical studies share the conviction that accessibility of ICT resources in content delivery could be of help to teacher educators. The study adopted survey research design. The population of the study comprises of all the lecturers in Federal Colleges of Education in Nigeria. They are Five Thousand and Seventy One (5,071) in number. A sample size of eight hundred and forty three (843) lecturers was used for the study. The instrument for data collection was a modified questionnaire.

The content validity of the instrument was ascertained by giving the questionnaire to two specialists in the field of educational technology and one from measurement and evaluation. Twenty (20) copies of the questionnaires were pilot tested in Federal College of Education Kano to ascertain the reliability of the instrument. The reliability co-efficient of 0.96 was obtained at 0.05 level of significant. The percentages were used to interpret the demographic data of the study, while frequency counts were used to answer research questions 1-6, and descriptive statistics was used to answer research questions 7and8 respectively. The independent t-test was also used to answer research hypothesis 1 and One way ANOVA was used for hypothesis 2, and were tested at $p>0.05$ level of significance using Statistical Package for Social Science (SPSS).

5.3 Conclusion

In view of the findings of this study, it is concluded that a good number of ICT resources used in content delivery by lecturers were fairly available in Federal Colleges of Education in Nigeria. This might be due to the non provision of ICT resources by the school management or the government. This study found that most lecturers had no access to basic ICT resources in content delivery. This may be because their schools are not connected to the internet. It was also established from the study that lecturers in Federal Colleges of Education are not well proficient in the utilization of ICT resources in content delivery. This may be due to lecturers' inadequate ICT skills.

It was also confirmed that lecturers perceived the usefulness of ICTs as very useful in their teaching. This finding might not be unconnected with the fact that the lecturers know the importance inherent in the use of ICT in the teaching/learning. The study also found that the lecturers in FCE are not well exposed to some ICT resources in their content delivery. There were a lot of challenges to the effective use of ICT resources in content delivery by

lecturers in FCE. The study showed that the major challenge facing lectures on using ICT in FCE in Nigeria are irregular power supply.

This study found out that a significant difference exists between female lecturers and female lecturer's view on ICT availability/utilization. It has also concluded that significant differences exist in lecturers' perception on ICT availability and utilization in content delivery in FCE on account of their academic qualifications. The findings and the conclusion of this study can, therefore, said to have answered both research questions and research hypotheses.

5.4 Implications of the Findings

The operational use of ICT resources such as computers, e-mail, fax machine, YouTube, video conferencing, social media and the like have made it possible to overcome barriers of time and space, and opens new opportunities for teaching and learning. The use of these ICT resources is increasing, and it is now possible to conduct research, deliver training and teaching to a wide number of the audience by means of a broadband network. There is now an increasing awareness regarding the importance of ICTs in learning. Various public and private institutions in the country are now infusing ICT in their teaching and learning activities. The computers, mobile phones and internet facilities around complemented by the cybercafé have provided both students and teachers an unprecedented opportunity to join millions of their colleagues around the globe to surf and navigate.

Meanwhile, this study has generally revealed that ICT now has far reaching implications for teaching and learning at the tertiary level of education in Nigeria. This is because lecturers positively perceived the benefit of ICT use in their teaching. It is also

pertinent to mention that most of the lecturers are still affectionate of the old method of chalk and talk, the practice which will make them lag behind in the world of ICT.

There is need for the lecturers in FCE to access and utilize ICT resources in content delivery at this technological era. This would assist them to keep up with the pace of development and use of ICT worldwide. It is also germane for the lecturers to be exposed and proficient with ICT resources in order to have the required skills, otherwise they cannot compete favorably with their counterparts across the globe. There is a need for a shift from conventional teaching to e-learning and also a review of the curriculum from time to time that will enable lecturers to keep in touch with ICT development, new knowledge and research on teaching and learning. Stability of electricity would also go a long way in making ICT resources accessible to lecturers and utilization in content delivery. Women, while given support and encouragement would compete favorable in the use of ICT in content delivery.

5.5 Recommendations

1. There is a need for the Government, National Commission for Colleges of Education (NCCE) and other Education stakeholders to respond positively and provide enough ICT infrastructures in all the FCE across the country so as to encourage lecturers to utilize them in their teaching.
2. There should be teacher training programmes and skill development of teachers that will encourage them to have the requisite skill, competence and exposure to enable them to be more proficient in the utilization of ICTs in teaching/learning activities. The Government can do this by partnering with other organizations to provide training and the tenure of such training or workshop periodically.

3. The government, National Commission for Colleges of Education and the managements of FCE should join hands together and ensure that computer laboratories are provided with adequate functional computer hardware and software.
4. There should be a functional internet that will cater for the need of both lecturers and students.
5. There should be encouragement on the spread of ICT and increase its availability, accessibility and utilization by the lecturers.
6. The government should ensure that a stable power supply is provided in the country. This will go a long way in making ICT or e-learning practicable in FCE.
7. The government should introduce and implement oriented policies that will support ICT related teaching methods. This will encourage both students and lecturers to utilised ICT in teaching/learning activities.
8. Emphasis should be given to the pedagogy behind the utilization of ICTs for teaching/learning activities.
9. The government should increase funding for the educational sector with emphasis on ICT that will help improve the level of ICT facilities in the schools.
10. A focused and timely effort to provide female lecturers with ICT knowledge and skills that can enable them to compete successfully in the global information economy and play a leadership role in its progress.

5.6 Suggestions for Further Studies

This study considers the following research areas for further studies in order to fill whatever gaps it has left:

1. A survey of the availability and utilization of Information and Communication Technology among state own colleges of education lecturers in Nigeria.
2. Compares between Federal and State Colleges of Education on Information and Communication Technology resources availability and utilization in content delivery in Nigeria.
3. Comparism between Northern and Southern Colleges of Education Lecturers' view on Information and Communication Technology resources availability and utilization in instructional delivery in Nigeria.
4. Impact of Information and Communication Technology on Students Academic Achievements in Nigerian Colleges of Education.
5. Comparism between Federal Colleges of Education and University Lecturers' view on Information and Communication Technology resources availability and utilization in instructional delivery among in Nigeria.
6. Additional variables other than the ones used in this study should be explored.
7. In order to improve the generalization of this study's findings, future studies should increase the population of the study as well as the sample size.

5.7 Limitations of the study

This study, like human endeavors, had its limitations. First, it is limited to Federal Colleges of Education and covered only six colleges out of 21, with a total number of 843 lecturers as participants. But this limitation was addressed by the versatility of the lecturers' component, which cut across the six geopolitical zones of the country. This

means that the findings of this study are supposed to be generalized. Secondly, the sample size used in this study was drawn from Federal Colleges of Education only. In order to increase the sample size as well as take into accounts the composition of the research subjects more federal and state colleges of education need to be incorporated to further validate this study's findings. Thirdly, the study was centered on ICT component used in content delivery. In light of this, further study should try and builds on the limitations of this by expanding its scope to cover more colleges of education in the country.

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APPENDIX I

QUESTIONNAIRE FOR FEDERAL COLLEGES OF EDUCATION LECTURERS

ASSESSMENT OF AVAILABILITY, ACCESSIBILITY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY (ICT) RESOURCES IN CONTENT DELIVERY AMONG LECTURERS IN FEDERAL COLLEGES OF EDUCATION IN NIGERIA

INTRODUCTION

This instrument is for a Ph.D research work. It is intended to assess the availability, accessibility and utilization of ICT resources in content delivery among lecturers in Federal Colleges of Education in Nigeria. The study is purely for academic exercise; as such you are assured of the confidentiality of your response.

Please feel free to respond as deemed appropriate. Thank you.

Instruction: The questionnaire has been designed under seven (7) different sections and harmonized in one single questionnaire; please endeavor to respond to all items by a tick (√) against the appropriate option that reflect or show your personal opinion to the item. Section A is for demographic data, while sections B - G is on "Assessment of availability, accessibility and utilization of ICT resources in content delivery among lecturers in Federal Colleges of Education in Nigeria".

Section A:

Demographic Data

1. **Name of College:** ……
2. **Sex:** Male [ ] Female [ ]
3. **Educational qualification:** B.Ed [ ] BA.Ed [ ] PGDE [ ] M.Ed [ ] Ph.D [ ]
4. **Others** [ ]

Section B:

ICT Resources Available to Lecturers in Content Delivery

Q .1. Which types of the ICT resources are available in you college? Please indicate from these options.

(Available (2), fairly Available (1), Not Available (0)

S/N	Ratings Items	Available	Fairly Available	Not Available
5	Computer hardware			
6	Computer software			
7	Integrated services digital network			
8	Fiber optics connection			
9	Smart board			
10	Learning management system			
11	Servers/Hubs			
12	Data projector			
13	Digital camera			
14	T V/ Radio			

Section C:

ICT Resources Accessible to Lecturers in Content Delivery

Q .2 Which types of the ICT resources are accessible to you in content delivery? Please indicate from these options. Accessible (2), fairly Accessible (1), Not Accessible (0)

S/N	Ratings Items	Accessible	Fairly Accessible	Not Accessible
15	Computer hardware			
16	Computer software			
17	Fax machine			
18	Word Processing			
19	Smart board			
20	Scanning machine			
21	Internet browsing			
22	Data projector			
23	Digital camera			
24	T V/ Radio			

Section D:

Lecturers' perceived Proficiency of Using ICT Resources in Content Delivery

Q.3, what is your perceived proficiency of using ICT resources in content delivery? Please indicate from these options.

Proficient (2), fairly Proficient (1), Not Proficient (0)

S/N	Ratings Items	Proficient	Fairly Proficient	Not Proficient
25	Using ICT in content delivery			
26	Using ICT to conduct research			
27	Using ICT to assess students' performance			
28	Using ICT to keep students' records			
29	Using ICT to prepare lesson notes			
30	Using ICT to presents instructional materials			
31	Using ICT to motivate students' learning			
32	Using ICT to imparts learning on students			
33	Using ICT to control students' learning			
34	Using ICT to make lesson presentation more interesting			

Section E:

Lecturers' Perceived Usefulness of ICT Resources in Content Delivery

Q.4, what is your perceived Usefulness of using ICT resources in content delivery? Please indicate from these options.

Usefulness (2), fairly Usefulness (1), Not Usefulness (0)

S/N	Ratings Items	Usefulness	Fairly Usefulness	Not Usefulness
35	ICT helps in making teaching-learning more interesting.			
36	ICT help in distance learning programme.			
37	ICT enhances quality of work of the lecturers.			
38	It makes lecturers to be up-date in their various disciplines.			
39	ICT help reduces examination malpractice in administration.			
40	ICT enhances efficiency of work.			
41	It improved quality of teaching.			
42	It enhances the management of financial records.			
43	ICT reduces lecturers' workload.			
44	ICT enhances collaboration among lecturers in getting instructional content of courses globally.			

SECTION F:

Lecturers' Perceived Exposure of ICT Resources in Content Delivery

Q.5, what is your perceived exposure to ICT resources in content delivery? Please indicate from these options.

Exposed (2), fairly Exposed (1), Not Exposed (0)

S/N	Ratings Items	Exposed	Fairly Exposed	Not Exposed
45	Social network media services			
46	Virtual library gateways			
47	Search engines			
48	e-learning			
49	Invisible websites			
50	World wide web (www)			
51	Online databases			
52	Subject directory			
53	skills to use ICT			
54	Periodic training organized for teachers on the use of ICTs			

Section G:

Lecturers' Perceived Challenges in Adopting I ICT Resources in Content Delivery

Q.6, what are your perceived Challenges in using ICT resources in content delivery? Please indicate from these options.

Challenged (2), fairly Challenged (1), Not Challenged (0)

S/N	Rating Items	Not Challenged	Fairly Challenged	Challenged
55	Lecturers' inadequate ICT skills			
56	Lack of confidence in using ICTs			
57	Lack of knowledge of how to evaluate the use and role played by ICT in teaching and learning			
58	Insufficient knowledge of appropriate software			
59	Poor infrastructures			
60	insufficient time to make use of the computer			
61	Irregular power supply			
62	Inadequate facilities to support full the application of ICT			
63	Non inclusion of ICT programmes in teachers' training curriculum			
64	Lack of fund			
65	Cost of purchasing computers			

THANK YOU FOR COMPLETING THE QUESTIONNAIRE

APPENDIX II

NATIONAL COMMISSION FOR COLLEGES OF EDUCATION, ABUJA
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35	COE GIDAN WAYA	4	0	7	3	33	0	95	18	0	0	87	9	47	9	38	11	44	12	5	0	0	0	360	62
36	COE GINDIRI	4	3							25	4	76	15	21	5	18		54	15	4	1			202	43
37	COE GUMEL	1	0	6	2	89	6	0	0	27	1	13	1	26	0	5	0	35	0	7	0	9	2	218	12
38	COE HONG	4	0	0	0	59	8	0	0	14	2	16	7	10	0	3	1	26	4	3	1	12	0	147	23
39	TASCE IJEBU - OMU	1	1	0	0	0	0	0	0	68	21	0	0	0	0	138	41	0	0	0	0	1	0	208	63
40	COE IKERE-EKITI	2	1	24	5	34	23	0	0	0	0	48	6	69	15	16	1	63	8	20	5	8	2	284	66
41	COE ILA-ORANGUN	13	1	9	2	25	12	0	0	25	8	17	4	36	7	36	3	23	4	11	1	1	0	196	42
42	COE ILESHA	27	6	10	2	20	8	35	16	14	4	16	3	29	7	47	9	18	4			0	0	216	59
43	COE ILORIN	0	0	2	1	9	1	32	5	0	0	18	9	57	18	1	1	41	13	20	6	4	3	184	57
44	COE JALINGO	1	1	21	8	20	3	0	0	92	19	21	7	37	4	17	2	31	12	7	1	25	2	272	59
45	COE KATSINA-ALA	0	0	7	4	48	3	32	5	0	0	47	11	66	13	15	1	66	17	7	1	14	0	302	55
46	S.R. COE KUMBOTSO	6	0	7	2	163	29	126	20			54	11	151	32	7	0	82	21	14	1	7	7	617	123
47	COE (T) LAFIAGI	1	0	7	1	11	2	32	2	0	0	11	0	3	1	9	0	7	0	2	0	1	0	84	6
48	KICOE MAIDUGURI	DNS	DDNS					0	0															0	0
49	COE MINNA	7	0	5	0	69	11			66	15	65	19	70	12	15	4	24	10	7	3	0	0	328	74
50	NOCOE NSUGBE	0	0	0	0	17	7	62	33			136	58			22	16	45	22	3	2	0	0	285	138
51	COE OJU																							324	42
52	COE ORO	0	0	6	1	36	5	0	0	8	3	13	3	43	2	1	0	22	3	9	1	0	0	138	18
53	AOCOE OTO-IJANIKIN	3	1	5	3	0	0	10	2	0	0	0	0	79	28	39	11	73	15	28	10	0	0	237	70
54	E.A. COE OYO	0	0	10	1	0	0	0	0	25	1	1	1	44	7	63	15	54	13	31	5	3	3	231	46
55	COE PORTHARCOURT	2	0	0	0	23	8	10	3			69	25	150	26	0	0	79	36	116	29	65	14	514	141
56	SSCOE SOKOTO	9	0	0	0	86	10	105	26	0	0	99	19	66	15	6	1	51	29	10	1	14	4	446	105
57	COE WAKA-BIU					50	6			39	5	15	2	7		15	4	3						129	17
58	COE WARRI	9	2	14	10	82	16	0	0	22	10	21	9	10	17	5	2	23	15	9	5	4	3	199	89
59	ST. AUG. COE LAGOS	1	0	0	0	0	0	0	0	0	0	0	0	14	3	2	2	16	5	7	7	1	0	41	17
60	IOECU COE ENUGU	2	2	6	2	18	9	0	0	0	0	14	7	14	2	4	4	14	6	13	3	0	0	85	35
61	OSISA TECH ENUGU	1	1	0	0	13	5	0	0	1	0	9	1			1	0		0			0	0	25	7
62	NASE ILORIN	0	0	6	2	1	0	58	20	6	2	12	4	33	10	15	5	5	0					136	43
63	FCT COE ZUBA	0	0	2	0	26	14	71	19	0	0	35	17	36	12	0	0	37	13	10	6	0	0	217	81
64	JNI COE KADUNA	DNS	DNS																					0	0
65	SULAIMAN COE OSOSA	DNS	DNS																					0	0
66	COE MARU	3	1	0	0	0	0	0	0	142	2	2	0	28	3	0	0	8	1	6	0	0	0	189	7
67	YEWA CENTRAL COE AYETORO	0	0	3	0	9	1	0	0	18	3	11	3	10	2	20	4	20	4	5	1	2	1	98	19
68	DELAR COE IBADAN	3	0	3	0	17	3	0	0	4	0	11	3	13	0	5	0	3	0	1	0	0	0	60	6
69	MUFTAU LANIHUN COE IBADAN	0	0	0	0	5	1	0	0	1	0	13	2	0	0	2	0	31	6	0	0	19	7	71	16
70	ATCI COE ENUGU	DNS	DNS																					0	0

a

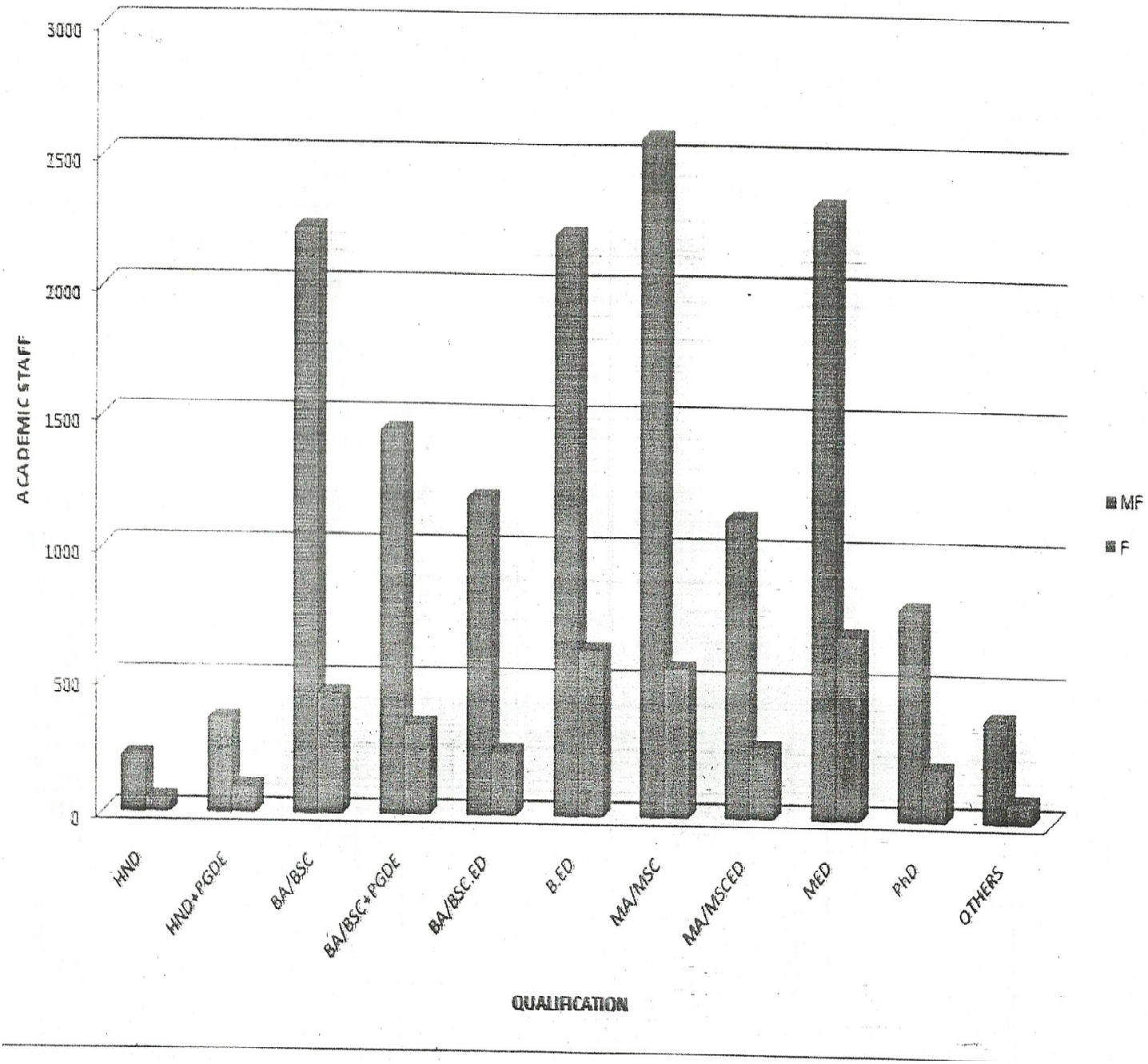
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		HND		HND+PGDE		BA/BSC		BA/BSC+PGDE		BA/BSC.ED		B.ED		MA/MSC		MA/MSCED		MED		PhD		OTHERS		TOTAL	
S/N	COLLEGE	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F	MF	F
1	FCE ABEOKUTA			1	0	24	10	0	0	14	4	3	2	59	22	16	4	75	31	27	8	1	0	220	81
2	FCE(T) AKOKA	16	7	4		35	14	0	0	13	3	14	3	27	8	0	0	39	13	16	7	2	1	166	56
3	FCE(T) ASABA	6	3	11	10	18	5	5	4	0	0	18	5	19	8	9	1	21	9	14	4	15	6	136	55
4	FCE(T) BICHI	9	2	15	2	41	6	14	8			68	24	18	0	4	0	16	2	7	2	32	6	224	52
5	FCE EHA-AMUFU	0	0	6	2	25	12	0	0	59	27	6		27	6	0	0	50	10	15	3	1	0	189	60
6	FCE (T) GOMBE	15	6	11	2	87	13	0	0	29	6	76	23	45	8	15	2	19	5	4	0			301	65
7	FCE GUSAU	5	0	8	2	26	3	13	0	0	0	76	25	10	0	17	4	15	2	1	0	0	0	171	36
8	FCE KANO	1	1	10	0	26	6			23	4	33	21	85	23	0	0	31	19	23	4	31	6	263	84
9	FCE KATSINA	0	0	2	0	22	4	71	16	0	0	36	9	13	0	32	11	25	5	8	0	8	1	217	46
10	FCE KONTAGORA	1	1	7	2	26	3	29	5	0	0	49	16	6	0	24	3	36	11	6	1	0	0	184	42
11	FCE OBUDU	4	3	3	1	43	9	75	19			50	15	47	4	13	0	30	5	12	3	20	3	297	62
12	FCE OKENE	4	2	3	1	0	0	40	8	61	18	36	10	24	6	42	3	43	9	9	4	0	0	262	61
13	FCE (T) OMOKU	5	2	0	0	85	20	12	2	0	0	0	0	83	17	0	0	0	0	9	2	0	0	194	43
14	ADEYEMI COE ONDO	1	0	0	0	27	5	0	0	11	2	6	5	154	32	17	2	35	11	37	8	0	0	288	65
15	FCE (SP) OYO	3	0	7	1	18	3	21	4	0	0	18	9	52	19	3	1	106	39	34	9	0	0	262	85
16	FCE PANKSHIN	0	0	0	0	53	15	0	0	64	16	28	7	48	13	36	19	83	18	13	3	24	2	349	93
17	FCE (T) POTISKUM	7	3	1	0	111	18	0	0	22	6	54	12	19	5	1	0	22	3	2	0	1	0	240	47
18	FCE (T) UMUNZE	3	0	4	2	29	14	24	15	0	0	3	2	27	14	2	2	32	21	18	7	0	0	142	77
19	FCE YOLA	0	0	2	0	53	12	0	0	27	6	26	12	57	17	10	4	25	4	8	1	2	0	210	56
20	FCE ZARIA	0	0	0	0	127	36	73	31	0	0	102	61	95	27	14	8	93	36	51	10	0	0	555	209
21	AI COE OWERRI	1	0	0	0	16	3			7	3	4	1	98	28	3	0	44	18	28	8			201	61
22	COE AFAHA-NSIT	DNS	DNS																					0	0
23	COE AGBOR	0	0	0	0	3	0	4	1	0	0	0	0	94	10	86	27	30	19	18	6	0	0	235	63
24	COE AKAMKPA	DNS	DNS																					0	0
25	COE AKWANGA			35	5			70	9			80	27			61	9	28	7	8		1		283	57
26	COE ANKPA	0	0	9	3	0	0	67	7	0	0	34	4	29	3	9	1	57	9	14	3	28	3	247	33
27	A.A. COE ARGUNGU	0	0	0	0	48	1	0	0	34	2	25	1	22	1	8	0	6	1		0	0	0	143	6
28	COE (T) AROCHUKWU	1	0	1	1	11	2	32	11	0	0	10	6	18	7	1	0	11	5	12	3	6	4	103	39
29	COE AZARE	6	1	13	6	26	2	119	15	0	0	58	7	25	1	0	0	15	2	1	0	0	0	263	34
30	UIECEST BAMA	3	0	6	2	35	2	20	4	0	0	17	3	16	0	11	1	2	1	1	0	0	0	111	13
31	IK COE DUTSIN-MA	4	2	1	0	52	1	0	0	29	2	87	3	10	0	8	2	2	0	0	0	0	0	193	10
32	COE EKIADOLOR	0	0	4	2	18	8	0	0	24	7	15	9	53	16	25	9	39	18	8	1			186	70
33	MOCOPED EPE	0	0	0	0	10	2	0	0	19	7	4	4	36	5	1	0	40	12	5	4	5	0	120	34
34	U.S. COE GASHUA	DNS	DNS																					0	0

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71	EBONYI STATE COE IKWO	3	1	2	0	10	2	0	0	94	11	2	0	14	6	0	0	42	8	6	2	0	0	173	30
72	CITY COE MARARABA GURKU	3	1	0	0	8	3	0	0	0	0	3	1	2	0	0	0	4	2	2	0	0	0	22	7
73	ANSAR-UD-DEEN COE ISOLO	0	0	1	0	12		9	2	3	1	12	0		0		0	18	0			0	0	55	3
74	CALVIN F. COE NAKA	0	0	0	0	36	4	0	0	0	0	6	0	5		0	0	4	0	0	0	4	0	55	4
75	MUHYIDEEN COE ILORIN																							62	7
76	ALL STATES COLLEGE OF EDUC. ERO	DNS	DNS																					0	0
77	BEST LEGACY COE, OGBOMOSO	1	0	0	0	9	0	3	1	0	0	35	5	14	0	3	0	22	3	8	0	0	0	95	9
78	ASSANUSIYA COE, OSUN	0	0	1	0	2	2	28	1	0	0	0	0	3	0	4	0	2	0	1	1	0	0	41	4
79	COE ILE-MONA,OFFA	0	0	2	0	5	2	7	3			13	7	5	2	8	2	8	1	0	0	0	0	48	17
80	REDEMPTION COE, ABA	0	0	0	0	0	0	0	0	0	0	12	4	1	0	9	0	16	5	2	1	0	0	40	10
81	CORNER STONRE COE, LAGOS	DNS	DNS																					0	0
82	ENUGU STATE COE(T) ENUGU	0	0	6	2	26	15	10	0	0	0	12	10	9	1	9	2	18	13	3	1	2	0	95	44
83	DELTA STATE COPE MOSOGAR	0	0	3	2	2	1	5	1	0	0	23	8	8	1	16	6	31	9	4	0	0	0	92	28
84	AFRICAN CHURCH COE AGEGE,IKEJA	0	0	6	0	19	6	0	0	6	1	5	1	8	1	1	1	10	3	2	1	0	0	57	14
85	COE NSUKKA	1	0	0	0	0	0	0	0	30	10	3	2	0	0	22	3	11	2	5	1	3	1	75	19
86	UCOE AUKPA-ADOKA	1				8				6	2	19		2		1		3						40	2
87	WAZIRI UMARU FED. POLY. B/KEBBI	2	0	8	1	0	0	12	0	0	0	0	0	0	0	10	0	0	0	0	0	0	0	32	1
88	H. U. KATSINA POLY.KATSINA					1		2				4				6						7		20	0
89	KANO STATE POLYTECHNIC, KANO	5				7						18				1		7	4					38	4
90	A.T.A POLYTECHNIC, BAUCHI	0	0	4	0	3	0	0	0	9	0	2	0	0	0	0	0	7	0	0	0	7	0	32	0
91	PLATEAU STATE POLY B/LADI	0	0	0	0	5	0	0	0	16	3	1		2		8	3							32	6
92	BAUCHI INST. A&IS. BAUCHI																							40	2
93	KADUNA POLYTECHNIC	DNS	DNS																					0	0
94	MOGCOLIS MAIDUGURI	0	0	0	0	6	0	19	4	0	0	13	4	11	0	3	0	11	4	4	2	1	0	68	14
95	COE IGUEBEN EDO STATE	1	0	0	0	3	1	0	0	5	2	1	1	13	2	1	0	22	6	1	0	0	0	47	12
96	HILL COE AKWANGA	0	0	5	1	8	1	3	2	0	0	44	6	0	0	0	0	27	5	0	0	0	0	87	15
97	RAMAT POLYTECHNIC MAIDUGURI	DNS	DNS																					0	
	TOTAL	216	55	362	99	2228	457	1455	342	1202	243	2214	631	2582	563	1135	268	2331	698	802	200	391	81	15344	368

CHART SHOWING DISTRIBUTION OF ACADEMIC STAFF BY INSTITUTION, QUALIFICATION AND SEX (2009/2010)



APPENDIX III

EDUCATIONAL AND PSYCHOLOGICAL MEASUREMENT
1970, 30, 607-610.

DETERMINING SAMPLE SIZE FOR RESEARCH ACTIVITIES

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The ever increasing demand for research has created a need for an efficient method of determining the sample size needed to be representative of a given population. In the article "Small Sample Techniques," the research division of the National Education Association has published a formula for determining sample size. Regrettably a table has not bee available for ready, easy reference which could have been constructed using the following formula.

$$s = X^2NP(1-P) \div d^2(N-1) + X^2P(1-P).$$

s = required sample size.

X^2 = the table value of chi-square for 1 degree of freedom at the desired confidence level (3.841).

1.96 x 1.96 = 3.8416

N = the population size.

P = the population proportion (assumed to be .50 since this would provide the maximum sample size).

d = the degree of accuracy expressed as a proportion (.05).

No calculations are needed to use Table 1. For example, one may wish to know the sample size required to be representative of the opinions of 9000 high school teachers relative to merit pay increases. To obtain the required sample size enter Table 1 at N = 9000. The sample size representative of the teachers in this example is 368. Table 1 is applicable to any defined population.

The relationship between sample size and total population is illustrated in Figure 1. It should be noted that as the population increases the sample size increases at a diminishing rate and remains relatively constant at slightly more than 380 cases.

REFERENCE

Small-Sample Techniques. *The NEA Research Bulletin*, Vol. 38 (December, 1960), p. 99.

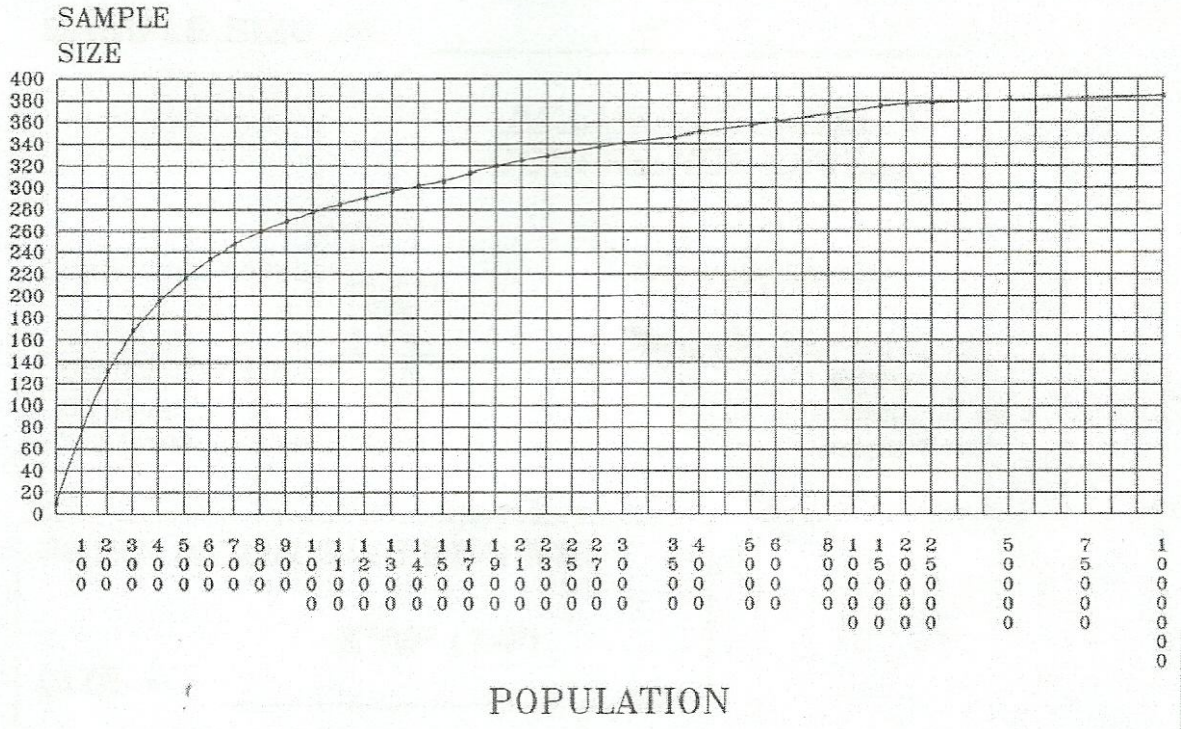
TABLE 1

Table for Determining Sample Size from a Given Population

N	*S*	*N*	*S*	*N*	*S*
10	10	220	140	1200	291
15	14	230	144	1300	297
20	19	240	148	1400	302
25	24	250	152	1500	306
30	28	260	155	1600	310
35	32	270	159	1700	313
40	36	280	162	1800	317
45	40	290	165	1900	320
50	44	300	169	2000	322
55	48	320	175	2200	327
60	52	340	181	2400	331
65	56	360	186	2600	335
70	59	380	191	2800	338
75	63	400	196	3000	341
80	66	420	201	3500	346
85	70	440	205	4000	351
90	73	460	210	4500	354
95	76	480	214	5000	357
100	80	500	217	6000	361
110	86	550	226	7000	364
120	92	600	234	8000	367
130	97	650	242	9000	368
140	103	700	248	10000	370
150	108	750	254	15000	375
160	113	800	260	20000	377
170	118	850	265	30000	379
180	123	900	269	40000	380
190	127	950	274	50000	381
200	132	1000	278	75000	382
210	136	1100	285	1000000	384

Note.—*N* is population size.
S is sample size.

SAMPLE SIZE VS. TOTAL POPULATION



FORMULAE FOR DETERMINING NEEDED SAMPLE SIZES

POPULATION SIZE UNKNOWN:

$$\text{SAMPLE SIZE} = \frac{\left(\frac{\text{RANGE}}{2}\right)^2}{\left(\frac{\text{ACCURACY LEVEL}}{\text{CONFIDENCE LEVEL}}\right)^2}$$

Confidence Levels:

	α	$\alpha/2$
.10 level	= 1.28	1.64
.05 level	= 1.64	1.96
.01 level	= 2.33	2.58
.001 level	= 3.09	3.29

Accuracy Levels:

Range X Desired Level of Accuracy (expressed as a proportion)

POPULATION SIZE KNOWN:

$$\text{SIZE} = \frac{X^2 NP\,(1-P)}{d^2\,(N-1) + X^2 P\,(1-P)}$$

X^2 = table value of Chi-Square @ $d.f. = 1$ for desired confidence level
.10 = 2.71 .05 = 3.84 .01 = 6.64 .001 = 10.83
N = population size
P = population proportion (assumed to be .50)
d = degree of accuracy (expressed as a proportion)