LITERACY LEVEL, AVAILABILITY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY AMONG LECTURERS OF POLYTECHNICS IN OSUN STATE

OLANIYAN, JAMES OLUWAYOMI
ND/23/LIS/PT/0039

BEING A PROJECT SUBMITTED TO THE DEPARTMENT OF LIBRARY AND INFORMATION SCIENCE, INSTITUTE OF INFORMATION AND COMMUNICATION TECHNOLOGY, KWARA STATE POLYTECHNIC, ILORIN

IN PARTIAL FULFILMENT OF THE REQUIREMENTS FOR THE AWARD OF NATIONAL DIPLOMA (ND) IN LIBRARY AND INFORMATION SCIENCE

JULY, 2025

CERTIFICATION

This is to certify that this project titled **"*Literacy Level, Availability and Utilization of Information and Communication Technology among Lecturers of Polytechnics in Osun State*"** has been read and approved as meeting the requirements of the Department of Library and Information Science, Kwara State Polytechnic, Ilorin, for the Award of National Diploma in Library and Information Science.

A. O. Isiaka (Supervisor)	Date
A. O. Isiaka (Head of Department)	Date
S. A. Sulyman (Project Coordinator)	Date
External Examiner	Date

DEDICATION

This research is dedicated to Almighty God.

DECLARATION

I, OLANIYAN, James Oluwayomi, a ND student in the Department of Library and Information Science, Kwara State Polytechnic, Ilorin, hereby declare that this research project titled *"Literacy Level, Availability and Utilization of Information and Communication Technology among Lecturers of Polytechnics in Osun State"*, submitted by me is based on my actual and original work. Any materials obtained from other sources or work done by any other persons or institutions have been duly acknowledged.

---------- ----------

OLANIYAN, James Oluwayomi Date
(ND/23/LIS/PT/0039)

ACKNOWLEDGEMENTS

Glory is to God Almighty for He is the author of wisdom, knowledge and understanding that has made it possible for me to obtain this degree.

I am profoundly grateful to my supervisor and Head of Department, an erudite scholar, Mr A. O. Isiaka, for his intellectual stimulation, valuable suggestions. He will forever be remembered for his contributions towards the successful completion of this programme. My appreciation goes to other lecturers in the Department of Library and Information Science, Kwara State Polytechnic: Mr. B. A. Aremu, Mr. S. A. Sulyman, Mrs. H. K. Abdulrahaman, Mr. M. A. Taiwo, Mr. S. Saba-Jibril, Mr. A. O. Idris, Mr. Y. O. Saadu and Mrs K. O. Abdulwahab for their contributions.

I am greatly indebted to my parents Mr and Mrs Olaniyan for their moral and financial support throughout the period of my primary and secondary education which led me into intellectual pursuit of my higher education, which is the best legacy. Special thanks to my siblings, other family members, friends and well-wishers for the love shown to me and financial support throughout this programme. I will never forget the rare words of encouragement they have given me.

Finally, my appreciation goes to the entire administrative staff in the department of Library and Information Science as well as academic and administrative staff in the Institute of Information and Communication Technology, their various words of encouragement led to the successful completion of this work and programme.

OLANIYAN, J. O.

July, 2025

TABLE OF CONTENTS

CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS

Abstract

This study investigated the information and communication technology literacy level, availability and utilization among lecturers of polytechnics in Osun State, it also examined the influence of gender in relation to lecturers ICT literacy level. The study was a descriptive survey and the population comprised all the lecturers of polytechnics in Osun State. A total of one-thousand-nine hundred and fifty-nine (1,959) lecturers form the population of the study. A total of three-hundred and twenty-two (322) lecturers were stratified and randomly selected from the target population. The instruments used to collect data for this study was questionnaire. Data collected were analyzed using frequency distribution table. The finding shows that the ICT literacy level of lecturers was high. The study also found out inadequate ICT facilities and low ICT utilization among lecturers. The study concluded that the ICT literacy levels of the lecturers in the selected polytechnics in Osun State is high with 93.8 of the lecturers having different levels of ICT. This shows that the lecturers are meeting the challenges of utilizing modern ICT facilities in their teaching and learning process. The recommendations based on this study include the followings: The lecturers should be engaged in higher ICT training, government should provide more ICT facilities in the colleges which will enhance better ICT utilization for lecturers, government should also introduce computer usage at the basic educational level to ensure that children get conversant with the use of computer from an early age.

Keywords: Information and Communication Technology, Literacy Level, Availability, Utilization, Lecturers, Polytechnics, ICT.

CHAPTER ONE

INTRODUCTION

1.1 Background to the Study

The convergence of İnformation and Communication Technologies (ICTs) has turned the whole world into a global village, making it possible to foster interaction with people in remote geographical locations of the world at previously unimaginable speed. This phenomenon has also shortened the turn around period of knowledge such that knowledge becomes obsolete almost as soon as it is acquired or learnt. The result of this development is that teachers are now challenged to be at the cutting-edge of knowledge production, modification and application (Olakulehin, 2011). The role of Information and Communication Technologies (ICTs) in the 21st century education system has been described as vital to keeping abreast with rapidly changing technologies. The development of information and communication technology into the Nigerian educational system has come to stay; its importance has been translated into huge potentials in terms of positive outcomes, although investments in ICTs in Nigerian's education system have not yielded much when compared to similar investments made in ICT in other areas (Yusuf, 2015).

All over the world, the computer and other ICT elements have taken over the work places since they have found application in virtually all human endeavours. Within minutes, financial transactions are brokered across continents through ICT driven banking technology, modern medicine has been greatly improved through telemedicine and events are monitored all over the world through digital satellite television technology. Indeed, ICT has turned the whole world into a global village (Oyelekan and Olorunde 2019). The field of education has also been affected by the penetrating influence of information and communication technology. Unquestionably, ICTs

has impacted on the quality and quantity of teaching, learning, and research in teacher education. Therefore, ICT provides opportunities for student teachers, academic and non-academic staff, to communicate with one another more effectively during formal and informal teaching and learning.

In the same vein, teachers need training not only in computer literacy but also in the application of various kinds of educational software in teaching and learning (Yusuf, 2015). According to Ololube, (2017) the introduction of ICT utilization, and integration has initiated a new age in educational methodologies, thus it has radically changed traditional method of information delivery and utilization patterns in the domain, as well as offering contemporary learning experience for both instructors and students. ICTS are becoming natural part of man's daily life, thus the use of ICTs in education by staff and students is becoming a necessity certainly the present and future academic global community will utilize ICTs to a higher degree. This has made it imperative that undergraduates not only need to use ICTs but they need to become comfortable in using them. This is to ensure that they participate fully in the life of the contemporary information age and also to accomplish their everyday task.

Tinio (2012) indicated that ICTs are a potentially powerful tool for extending educational opportunities both formal and non-formal, to previously underserved constituencies scattered and rural populations group traditionally excluded from education due to cultural or social reasons such as ethnic minorities, girls and women, person with disabilities and the elderly, as well as all others who for reasons of costs or because of time constraints are unable to enroll on campus. Currently, scientific and technological changes became the central feature of developmental strategies all over the world. In this country, the development of education in general and the development of sciences and technology education in particular, has not yet been very impressive.

According to Daniels (2012) ICTs have become within a very short time, one of the basic building blocks of modern society. Many countries now regard understanding ICT and mastering the basic skills and concepts of ICT as part of the core of education, alongside reading, writing and numeracy. However, there appears to be a misconception that ICTs generally refers to computers and computing related activities. This is fortunately not the case, although computers and their application play a significant role in modern information management, other technologies and/or systems also comprise of the phenomenon that is commonly regarded as ICTs.

1.2 Statement of the Problem

The present study sought to examine the effectiveness of information and communication technology literacy level, availability and utilization among lecturers of polytechnics in Osun State. It is pertinent to assert that educational systems around the world are under increasing pressure to use the new information and communication technologies (ICTs). The premise that ICT is important for bringing changes to classroom, teaching and learning is the basis for this pressure. It also indicated that keeping pace with technological development and the changing competencies required both students and their teachers to acquire a state of the art of curriculum and appropriate teacher development. Consequently, the teaching force in Nigeria need to be imbued with the rudimentary skills for applying ICTs and products of technology in their teaching and learning to foster greater intellectual understanding (UNESCO 2002). Central to information and communication technology is a knowledge of computer literacy in which the computer plays a central role in data collection, processing and dissemination. This makes it a key element of ICT.

Personal Computers (PCs) have become a common tool in offices, homes and shops. There is also a growing awareness on the part of people on the need to be ICT compliant, because it is also becoming increasingly difficult to be able to function effectively in the society without any knowledge of the ICT. Hence the demand for computer literacy or ICT literacy as the case may be, is now a pre-requisite for employment by employers of labour. There is at the moment, so much emphasis on computer literacy, and ICT literacy and the two closely related terms are commonly used interchangeably, whereas there are clear demarcations between the two (Oyelekan & Olorunde, 2019).

Despite the importance of ICT in facilitating teaching and learning, it has been observed that there are many challenges in bringing ICT into the Nigerian educational system. In her studies, Olabasi (2012) outlines major problems faced by ICT literacy in Federal Colleges of Education which includes the followings: lack of competent teachers who are ICT literate, inadequate ICT infrastructure including computer hardware and software, high and low band width access, inadequate skilled manpower to manage available system and inadequate training facilities for ICT education at the tertiary level, lack of competent teachers who are ICT literate, resistance to change from traditional pedagogical methods to more innovative, technology based teaching and learning method, by both students and academics, the overall education system is underfunded, therefore available funds are used to solve more urgent and important survival needs by the institutions, the overall dependence of educational institutions on government for everything has limited the institutions ability to collaborate with the private sector or seek alternative funding sources for ICT educational initiatives.

From the foregoing, careful examination of the militating problems of ICT literacy level, availability and utilization among lecturers of polytechnics in Osun State these arouse the need to conduct a study of this kind in order to close the existing gap in knowledge in the area, hence the present study.

1.3 Research Objectives

The general objective of this study is to examine the literacy level, availability and utilization of information and communication technology among lecturers of polytechnics in Osun State. The specific objectives are to:

i. Establish the ICT literacy levels among lecturers of polytechnics in Osun State;
ii. Highlight the available ICT facilities for lecturers to use in polytechnics in Osun State; and
iii. Identify the ICT facilities utilization among lecturers of polytechnics in Osun State;

1.4 Research Questions

This study set-out the following questions to be answered:

i. What is the ICT literacy levels among lecturers of polytechnics in Osun State?
ii. What are the available ICT facilities for lecturers to use in polytechnics in Osun State? and
iii. What are the ICT facilities utilization among lecturers of polytechnics in Osun State?

1.5 Scope of the Study

The study is concerned with the ICT literacy level, availability and utilization among lecturers in polytechnics in Osun State, and the influence of gender, in relation to the ICT literacy level of lectures. The study was conducted in all the nine polytechnics in Osun State and all the lecturers of the polytechnics form the population of this study. The independent variable of this study is ICT literacy level, and availability of the ICT facilities, and the dependent variables are gender, and utilization of ICT facilities. Therefore, the conclusion and recommendations of the study are based on the data collected from the sample population. The areas of ICT covered in this study are lecturers' literacy in basic computer operations, hardware and software operations, computer networking, basic ICT operations and basic ICT utilization. The study also investigated availability of ICT facilities in the polytechnics, and the level of ICT utilization among the lecturers in polytechnics in Osun State.

1.6 Significance of the Study

Curriculum planners, policy makers in teacher education programmes, government, lecturers and students in higher institutions of learning and educational services unit in Nigeria and a host of other stakeholders in the educational sector will tremendously benefit from the findings of this study. The study will assist the curriculum planners who are responsible for developing course content for teacher education programmes on the relevance and effectiveness of appropriate ICT knowledge and skills. The curriculum planners will determine whether or not the contemporary challenges faced by ICT are being taken care of in the curriculum, or there is a need to add more practical courses in the curriculum of NCE, as well as preparing the students in meeting the innovations in the global world.

The findings of the study could provide a data for government that will give them information about the ICT literacy level of the lecturers, and the availability and utilization of ICT facilities in Federal Colleges of Education in the north west zone Nigeria, thus will make government to provide policies as well as providing enough Funds to the institutions and facilities on one hand, and the implementation of the policies by the coordinating bodies and the institutions themselves on the other hand. Therefore, the Federal Government through the National Universities Commission (NUC) National Commission for Colleges of Education (NCCE) and National Board for Vocational Colleges and Technical Education (NABTECH), need to invest heavily on the institutions that offer teacher education programs, especially in the area of ICT materials. This will create an enabling environment for teacher trainers to strive towards producing highly qualified ICT literate teachers that would assist in making the integration and utilization of ICT in secondary schools a success.

Significantly this study may create awareness to the lecturers in Polytechnics in Osun State and South-west region in general on the ICT literacy and gender differences on the lecturers they are producing and will enhance the result of their teaching experiences. Basically, it will assist the lecturers who have hitherto been under assumptions about their student's level of ICT literacy to give assignment and tasks that correspond with their student ability to source for information using ICT. It will also assist lecturers who are enthusiastic in developing ICT based lectures in choosing the appropriate pedagogical style that can be within the students' level of ICT. Lecturers on the other hand, by knowing their level of ICT literacy, it will provide them with the opportunity for self-assessment on their ICT skills and knowledge and by knowing its importance in teaching and learning.

1.7 Operational Definition of Terms

ICT: stands for Information and Communication Technology. It refers to all the technologies used to manage information and facilitate communication. This includes hardware, software, and networks.

Literacy Level: refers to a person's ability to read and write, categorized on a scale indicating their proficiency in understanding and utilizing written language, often ranging from basic to advanced levels, depending on the complexity of texts they can comprehend and produce effectively.

Availability: refers to the quality of being able to be used or obtained. Availability in this study, is the assurance that an enterprise's IT infrastructure has suitable recoverability and protection from system failures, natural disasters or malicious attacks.

Utilization: refers to an act or instance of making practical or profitable use of something. It is also referred to the act of using something in an effective way.

Lecturers: refers to a person who gives lectures, especially as an occupation at a university or college of higher education.

Polytechnics: refers to as an institution of higher education offering courses at degree level or below, especially in vocational subjects.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

2.1 Introduction

This chapter presents a review of related literature, which include the study of meaning and concept of ICT, ICT literacy in Nigeria, teacher education programs, and other related empirical studies conducted by scholars in information and communication technology. This study is concerned with a three basic concepts of information, communication and technology. The literature review should be conducted in a systematic way to achieve optimum results. The review of this study is guided by the following research outlines/subheadings:

2.2 Meaning and Scope of ICT

2.3 Theoretical Framework

2.4 ICT Literacy in Nigeria

2.5 The Integration of ICT in Education

2.6 Problems of ICT in Educational Institutions in Nigeria and Globally

2.7 Review of Empirical Studies

2.8 Summary of Literature Reviewed

2.2 Meaning and Scope of ICT

UNESCO (2012) in a comprehensive way sees ICT as a two-dimensional concept comprising of two words information and technology, the term information refers to any communication or representation of knowledge such as facts, data or opinions in any medium or for including textual, numerical, graphical, cartographic, narrative, or audiovisual forms. Technology on the other hand is the practical form of scientific knowledge or the science application of knowledge to practice. The Federal Ministry of Education, Nigeria (2014) defines ICT as encompassing all equipment and tools inclusive of traditional technologies of radio, video and television to the newer technologies of computers, hardware, software etc, as well as the methods, practices, processes, procedures, concepts and principles that come into the play in the conduct of information and communication technology. De Watteville and Gilbert (2010) have defined ICT as any potentially useful fact, quantity or value that can be expressed uniquely with exactness. Information is whatever is capable of causing a human mind to change its opinion about the current state of the real world.

Put together, therefore, ICT has been defined as: The acquisition, analysis, manipulation, storage and distribution of information; and the design and provision of equipment and software for these purposes. (De Watteville & Gilbert, 2010) also asserted that, ICT is complex and quickly changing, and it is confusing for many people. It is so pervasive in the modern world that everyone has some understanding of it, but those understandings are often wildly divergent. Information and Communication Technology (ICT) is defined as computer-based tools used by people to work with the information and communication processing needs of an organization. It encompasses the computer hardware and software, the network and several other devices video, audio, photography

camera, etc. that convert information (text), images, sound, motion, and so on into common digital form Milken Exchange on Educational Technology.

According to UNESCO (2012) information and communication technology (ICT) is regarded as the combination of 'Informatics technology' with other related technology, specifically communication technology. Informatics refers to the science dealing with the design, realization, evaluation, use and maintenance of information processing systems, including hardware, software, organizational and human aspects, and the industrial, commercial, governmental and political implications of these. Informatics Technology on the other hand is defined as the technological applications (artifacts) of informatics in society. From a less technical viewpoint the term information and communication technology (ICT) refers to the range of technologies that are applied in the process of collecting, storing, editing, retrieving and transfer of information in various forms. The foregoing definition implies that a broad range of technological equipment such as computers, mobile telephones, MP3/MP4/WMA storage devices, file transfer protocols, listservs, satellites, world wide web etc are used for information exchange among people for different purposes.

These devices are capable of both synchronous and asynchronous communication formats, and the most advanced of these technological applications is the concept of multimedia, which refers to teaching and learning devices that include a combination of data manipulators e.g. video, CD ROMs, floppy disks etc which facilitates interactive communication between and among individuals. Given these descriptions of the components of ICTs, it should be clear why ICTs are considered a more robust and all-encompassing phenomenon than the popular narrowly held conception of mere application of computers in human activities UNESCO (2012). The Longman dictionary of contemporary English (1995) also refers to computer literacy as the ability to

understand and use computers. ICT literacy is increasingly being seen as a capacity for purposeful and effective utilization of ICT technologies in one's own setting and this creates different needs for different people. It is now recognized that ICT literacy describes a range of personal competencies that are in many cases distinct from ICT components specific to the need of individual subject disciplines and domains.

According to Bandele (2017), the computer is a data processing electronic machine that generates meaningful information as output. They come in various shapes and sizes and some are customized only for specific purposes. Modern computers are actually small enough to fit into mobile devices, and can be powered by a small battery like we have in mobile handsets. An all-general-purpose computer requires device memory which enables a computer to store, data and programs, and mass storage which enables a computer to permanently retain a heavy data. More recently, Gay and Blades (2015) stated that ICT encompasses the effective use of equipment and programs to access, retrieve, convert, store, organize, manipulate and present data and information. In their own assertion, Oyelekan and Olorunde (2019) viewed ICT as the scientific methods of storing and processing information and correspondingly sharing, exchanging and sending or moving such information from one place to the other. They stated further that ICT should be seen not from the ordinary use of modern electronic equipment like radio or television, but from the new communications and telecommunications technologies that use the interconnectedness of computer resources and supporting equipment to process, manage and transfer information, identifying the internet as the undisputable single technology of our age that drives the information and communication technology.

Akinola (2015) defines the internet or simply the net as a global collection of many different types of computers and computer networks that are interconnected together. In a related view, Lawal (2011), describes internet as a vast information superhighway that facilitates communication between computer users both nationally and internationally. He stressed further that; it enables computers of all kinds to share services and communicate directly as if they were a part of a giant global computing machine. Emmanuel (2015) described the electronic mail (e-mail) as a way of communicating person to person via computer. In related view, Eruanga (2015) remarked that electronic mail is a common resource provided by the internet, it is a world-wide system for sending and receiving messages by electronic means rather than paper-based communication. He further stated that electronic mail enables the sender who knows electronic networking procedures to send mail via computer to other users around the world or to the addressee(s) of the recipient(s) within the shortest possible period of time.

Teleconferences provides an enabling avenue for information to be shared among various individuals by the use of a keyboard and screen. Emmanuel (2015) described teleconferences as an activity where users converse with others in real time speaking, through their keyboards and hearing through the screen. Eruanga (2015), viewed teleconferences as a system that allows numerous people to be simultaneously connected so that discussions can take place even though they do not meet. Facsimile Transmission (FAX) is communication equipment that performs function of photocopying and at the same time provides immediate answers for information received. In the same vein Eruanga (2015) stated that this is a type of communication equipment that has some facilities of telephone answering machine and photocopying machine. He stated further that it has an automatic reply devise such that a message is being sent at one end, the fax machine at the receiving end will give reply immediately.

Emmanuel (2015) pointed out that FAX basically involves sliding a sheet of paper into one fax machine and having a black and white duplicate emerge from another fax machine almost anywhere in the world in seconds or less. Priya (2013) also identifies different types and modes of communication system which include: Video Media - which include projective and non-projective materials, pictures, story books, puppets, daily newspapers, mute films, photo fax, magazines, physical tools, post telegraph, fax pager. Audio Media - radio, tape recorder, telephone, mobile phone, audio CD, voice mail. Audio Video Media - television, films, VCD, phone, computer, internet, teleconferencing Evans (2013) said; ICT is an acronym for information and communication technology however there is no general meaning for an ICT because the concept methods and applications embedded on it are continually emerging. Along these lines ICT accounts products that store retrieve manipulate transmit information in a digital Format (that is television, computers, E-mails or artificial intelligent) thus, ICT is more adherent with the storage retrieval, manipulation, transmission of digital data and ways these things work in relevance with each other.

Digital Communication Technology - In digital communication technology the technology is attributed to the communication of information and data by electronic aid, customarily over some radius or distance carried out via the web and network of sending and receiving machinery, satellite links and wire. There are two forms of digital communication technology. These are: The Internal Network - that is the LAN or local area network which requires connecting numerous hardware components inside an office or any establishments. External Network - WAN that is wide area network, hence the internet is the absolute WAN since it is boundless web of networks. ICT is an electric application of computing, communication, telecommunication and satellite technology. The information accessed through digital technologies can promote innovation. Increase

productivity and enrich the quality of lives, ICT in education is broad, deep and rapidly growing field of study.

ICT utilizes a broad range of technologies that are applied in the process of collecting, storing, editing, retrieving, and transfer of information in various forms. One of the major factors of agencies of national development and global competitiveness is education. In the last few decades ICT has increasingly played a critical role in all fields of humans endeavors it is being used globally to translate ideas into realizable goals and develop same into concrete achievement. Yusuf (2014). Moursund (2015) stated that ICT brings some very powerful aids to translating theory into practice. Two of these aids are computer assisted learning and distance education, these days computers with internet connectivity have become common household items students often have access to, Moursund also identified two types of ICT which include: Pure educational pedagogies which are specifically design to provide instruction to help the user learn communication tools and reference materials including E-mail, web, encyclopedia, books and other reference materials.

Pure entertainment that is games that are not designed to be educational tools such as words processor graphics software etc cellular phones, household computers games and toys, television, CD players and recorders, video tape players and recorders are now common place Moursund (2015). Today ICT provides knowledge-based system that include knowledge acquisition, knowledge incubation, knowledge application and knowledge dissemination, it is evident that information is a key resources which permeates teaching, learning, researching and publishing Moursund (2015). However, there are aspects of digital communications that one needs to be aware of. These relate primarily to the types of networks and the ways of connecting to the Internet.

Internet Network is contextually viewed as a local area network (LAN), this involves linking a number of hardware items (input and output devices plus computer processing) together within an office or building. The aim of a LAN is to be able to share hardware facilities such as printers or scanners, software applications and data. This type of network is invaluable in the office environment where colleagues need to have access to common data or programmes. External Network Connect on the other hand is applied when one needs to communicate with someone outside his internal network, in this case one will need to be part of a Wide Area Network (WAN). The Internet is the ultimate WAN - it is a vast network of networks. To fully understand the usefulness of information technology in education, it will be important for the meaning of the two terms "computer" and "information technology" to be clarified.

A computer is defined in the oxford-advance learner's dictionary as "…… electronic device which stores information on e.g. magnetic tape, analyses is and produces information as required from the data on the tapes." The computer can again be explained as a programmable electronic machine, in which information either in words or numbers in the form of data can be inserted and stored, and the stored information can be manipulated or retrieved at any time. With regards to Information and communication Technology, Abdullahi (2010) drew our attention to the fact that "how a person or a group of persons define information and communication technology depends on their perception of it. Consequently, there is bound to be considerable variation from person to persons or group to group." For example, how an accountant will perceive information and communication technology will be different from the perception of a librarian, which will be different from the perception of an engineer, and which will also be different to how a doctor will perceive it etc.

Weert (2010) explained that, information and communication technology comprise the methods and technical means of capturing, storing, processing, retrieving and transmitting both data and the information borne by the data, thus enhancing man's knowledge and extending his capacity to control technical and social processes. To Zorkoczy (2010) meaning of information and Communication Technology is.…….the collection, storage, processing, dissemination and use of information…….. It is not confined to hardware and software, but acknowledges the importance of man and the goals he sets for this technology, the values employed in making these choices, the assessment criteria used to decide whether he is controlling the technology and is being enriched by considerable variation from person to person or group to group.

A careful consideration of the meaning and concept of ICT makes it easy to think that hardly can any profession survive or continue to be relevant without the integration of ICT. ICT encompasses all the technologies used to transmit or disseminate information to audience. These cover internet services provision, telecommunications equipment and services, media and broadcasting, and other related information and communication activities. Modern ICT products include E-mail, voice mail, fax, internet, electronic bulletin board, cellular phone, video conferencing among others (Rafiu, 2011).

2.3 Theoretical Framework

The Theory of Performance develops and relates to six foundational concepts (italicized) to form a framework that can be used to explain performance as well as performance improvements. To perform is to produce valued results. A performer can be an individual or a group of people engaging in a collaborative effort. Developing performance is a journey, and level of performance describes location in the journey. Current level of performance depends holistically on

components: context, level of knowledge, levels of skills, level of identity, personal factors, and fixed factors. Three axioms are proposed for effective performance improvements. These involve a performer's mindset, immersion in an enriching environment, and engagement in reflective practice.

Traditional Contexts: A Theory of performance informs learning in classrooms, workshops, and other venues that are traditionally associated with learning.

Non-Traditional Contexts: A Theory of performance informs learning in contexts that are not traditionally conceptualized as learning environments. Examples of these contexts include academic advising, self-development, departments, academic committees, professional research groups, and colleges.

Performance: To perform is to take a complex series of actions that integrate skills and knowledge to produce a valuable result. In some instances, the performer is an individual. In other performances, the performer is an individual; in other instances, the performer is a collection of people who are collaborating, such as an academic department, research team, committee, student team, or a university.

• As an academic department improves its level of performance, the members of the department are able to produce more effective student learning, more effective research, and a more effective culture.

• As a teacher advances his levels of performance, he is able to produce deeper levels of learning, improved levels of skill development, and more connection with the discipline for larger classes while spending less time doing this.

Theory of performance presented here is similar to other constructs in the literature. The Parallel Curriculum, advocated by Tomlinson, Kaplan, Renzulli, and Burns, (2012), advocates four parallel curriculums that reinforce the four adjustable components. The core curriculum and the curriculum of connections focuses on knowledge construction. The curriculum of practices emphasizes context and promotes skill development. The curriculum of identity focuses on development of the individual as a member of a professional community. Support for the three axioms can also be found in writings by Caine, Caine, G., McClintic, and Klimek, (2015). Relaxed alertness aligns with the performer's mindset. Orchestrated involvement in complex challenges and supportive experiences aligns with immersion. Active processing of experiences aligns with reflective practice.

Additional support for the axioms can be found in the work of Bransford, Brown and Cocking (2010). Their model for effective teaching and learning includes knowledge-centered, learner-centered, assessment-centered, and community-centered components. The learner centered component involves the performer's mindset. The knowledge-centered and community centered components connote immersion in an enriching environment, while the assessment centered component embraces elements of reflective practice. The importance of having a well-founded conceptual model, appropriate methods for data collection, and reliable and robust system for making inferences about observations is well-established in the work of Pellegrino and Glaser (2011), and this undergirds reflective practice in organizational contexts.

2.3.1 Description of Maslow's Motivation Theory

Abraham Maslow is considered to be the father of Humanistic Psychology, also known as the "Third Force". Humanistic Psychology incorporate aspects of both Behavioral Psychology and Psychoanalytic Psychology. Behaviorists believe that human behavior is controlled by external environmental factors. Psychoanalytic Psychology is based on the idea that human behavior is controlled by internal unconscious forces. Though he studied both Behavioral and Psychoanalytic Psychologies, Maslow rejected the idea that human behavior is controlled by only internal or external forces. Instead, Maslow's motivation theory states that man's behavior is controlled by both internal and external factors. In addition, he emphasizes that humans have the unique ability to make choices and exercise free-will.

Maslow showed little interest in animal or laboratory studies of human behavior. He chose instead to collect data for his theories by studying outstanding individuals. His studies led him to believe that people have certain needs which are unchanging and genetic in origin. These needs are the same in all cultures and are both physiological and psychological. Maslow described these needs as being hierarchal in nature, meaning that some needs are more basic or more powerful than others and as these needs are satisfied, other higher needs emerge.

Explanation of Hierarchy: Maslow presents a hierarchy of needs which can be divided into basic needs and growth needs. One must satisfy lower-level basic needs before progressing on to meet higher level growth needs. Once these needs have been reasonably satisfied, one may be able to reach the highest level called self-actualization.

Importance of Maslow's Theory to Education: The most important educational goal is for students to learn. Another important goal is to make this newly gained knowledge and information purposeful and meaningful to the students so that it may be retained and useful through their lives.

An essential factor involved in meeting these goals is motivation. If students are unmotivated in one way or another, it is likely that little learning will take place, or if by chance some learning should take place, it is probable that it will not be retained.

This theory has great impact on educational structure. In order to maximize on the effectiveness of school-wide and individual classroom teaching programs, administrators and teachers must consider student needs and their hierarchal order. This must be a top priority in the development of these programs so that students have the capability of reaching their highest levels of potential. For instance, if a student has not had her breakfast before she comes to school, she will not be concentrating on learning; she will be preoccupied with the need for food. Because there are many children who come to school without a proper breakfast, school systems must meet this need by providing breakfast programs so that these children will be more likely to learn effectively.

Teacher's Role: I have come to the frightening conclusion that I am the decisive element in the classroom. As a teacher, I possess tremendous power to make a child's life miserable or joyous. I can be a tool of torture or an instrument of inspiration. I can humiliate or humor, hurt or heal. In all situations, it is my response that decides whether a crisis will be escalated or de-escalated, and a child humanized or dehumanized (Ray 1992). Jones & Jones (1990) showed that how teachers conduct their classrooms is a major factor directing students' motivation. Therefore, it is the responsibility of teachers to know what their students' needs are, to understand the concept of Maslow's hierarchy, and to develop their teaching programs accordingly. Ray (1992), stated, "In the educational scene the teacher has the primary responsibility to develop, encourage, enhance, and maintain motivation in the student". In his later years, Maslow realized that an environmental precondition of stimulation, or challenge, was needed to motivate individuals.

Maslow's Motivation Theory and Its Application to Education: The Job Characteristics Theory is a framework for identifying how job characteristics affect job outcomes. Learning Objective

• Analyze the core characteristics, psychological states, and work outcomes in the Job Characteristics Theory,

Core Characteristics: The Job Characteristics Theory (JCT), also referred to as Core Characteristics Model, is widely used as a framework to study how particular job characteristics impact job outcomes, including job satisfaction. The theory states that there are five core job characteristics:

1. *Skill variety*
2. *Task identity*
3. *Task significance*
4. *Autonomy*
5. *Feedback*

Each job has these characteristics to a greater or lesser extent. No one combination of characteristics makes for the ideal job; rather, it is the purpose of job design to adjust the levels of each characteristic to attune the overall job with the worker performing it. This alignment is important because the worker brings psychological states to bear upon the job that affect job outcomes when combined with the core characteristics.

Psychological States: The core characteristics affect three critical psychological states of the workers doing the job:

1. *Experienced meaningfulness*
2. *Experienced responsibility for outcomes*
3. *Knowledge of the actual results*

The job characteristics directly derive the three states. Indeed, the first three characteristics skill variety, task variety and task significance pertain to the meaningfulness of the work. Autonomy directly correlates to responsibility for outcomes, and knowledge of the actual results relates to feedback. Pictured as a process flow, the characteristics and psychological states operate in continuous feedback loop that allows employees to continue to be motivated by thoroughly owning and understanding the work in which they are involved.

2.4 ICT Literacy in Nigeria

While all approaches to literacy are related to the ability to understand and communicate via written text, there is no standard definition of literacy that captures all its facets. Recognizing that people acquire and apply literacy for different purpose in different situations UNESCO (2014) UNESCO today view the concept of literacy as a plural notion recognizes that skills for written expression and comprehension are related to particular contexts and languages and that the value of these skills lies in the ability to apply them in a beneficial way. Nigeria as a nation has recognized the potential of ICT in her educational system. The national policy on computer education emphasized the need for the integration of ICT into the Nigerian educational system. This dates back to the National Policy on Computer Education FME, (1988) which emphasized the need for primary school pupils to be introduced to the basic computer skills, the use of the computer to facilitate learning and rudimentary use for text writing, computation and data entry.

For secondary school, they have related goals which were to be achieved at higher level. The tertiary institutions were also required to teach computer science as a discipline and to integrate it in school administration and instruction. However, the implementation was not effective. The National Policy on Education (FGN) as revised in (1988) and (2004) re-emphasized the need for

the integration of ICT in the Nigerian educational system. This is an acceptance of the need to go beyond computer to the level of ICT also the need for infrastructure. Education is generally acknowledged as one of the crucial allies of the development process. Thus, Nigerian educational policy makers and social planners, in recognition of its potentials for leveraging existing social stratifications, have placed a huge premium on the development of the education sector particularly the ICT sector. This is reflected in the emphatic resonance in the National Policy on Education NPE 1977, revised 1998, (2005) that 'no nation can rise above the quality of its education system'.

Based on this self-evident truth, the national policy formulators recommend, as a priority, the training of those responsible for facilitating the education of Nigerians in the development planning process. As a result, the National Policy on Education unequivocally stated that 'teacher education will continue to be given attention in all our educational planning, because no education system can rise above the quality of its teachers'. The field of education has certainly been affected by the penetrating influence of ICT worldwide. ICT has made impact on the quality and quantity of teaching, learning and research in the institutions using it. ICT has the potential to accelerate, enrich and deepen skills, motivate and engage students in learning; helps to relate school experiences to work places, helps to create economic viability for tomorrow's workers, contribute to radical changes in school, strengthens teaching, and provides opportunities for connection between the school and the world Kwacha, (2017).

The Nigerian government took a bold step in October of (1999), and issued a document on telecommunications development strategy and investment opportunities in Nigeria. Similarly in October 1999, the national policy on telecommunication was approved the document contained policy statements on objectives, structures, competition, policy, satellite communication, management structure, finance and funding, manpower development and training, research and

development, safety and security, international perspectives and policy implementation. (Ajayi 2012). The National Policy on Telecommunication was a key step in the development of infrastructural base for ICT, in (2001) the federal government approved the Nigerian national policy for information technology (IT) and followed this up with the establishment of the National Information Technology development agency (NITDA) which was charged with the implementation of the policy (Ajayi, 2012).

Alothman (2015) referred to multi literacy as a revolution in education leading to inevitable major shifts or changes in pedagogy related to technology and human values. He further stated that the purpose of multi literacy is to extend literacy teaching for our new times, i.e. creating lifelong learners who are FIT (Fluency in Information Technology) and be able to live with confidence in a new constantly changing society or world. Thus, a major dimension that has been brought into the definition of literacy is information technology, which we cannot talk about without talking about computers and which has been further extended as ICT. According to Needleman (2014), literacy is more than just being able to read and write, he added that "Literacy not only involves competency in reading and writing, but goes beyond this to include the critical and effective use of these in peoples' lives, and the use of language (oral and written) for all purposes.

According to the Council, the broad definition of literacy includes a variety of skills: reading text, document use, writing, oral communications, numeracy, thinking skills, computer use, working with others and continuous learning. According to Oliver and Towers (2010), the term computer literacy has long been used as a description of people’s skills and predisposition to the use of computers and information technologies. Computer literacy can also be referred to as the comfort level someone has with using computer programs and other applications that are associated with computers, this includes knowing how computers work and operate. O’Conor, Anderson, Bynum,

Gaston, de Castro et al. (2012) illustrated the foundational set of skills and knowledge that underlie ICT literacy and these are:

1. Cognitive Proficiency: According to them, cognitive proficiency has to do with the desired foundational skills of everyday life at school and workplaces. This proficiency is demonstrated in literacy, numeracy, problem-solving, and visual literacy.
2. Technical Proficiency: Includes a foundational knowledge of hardware, software applications, networks, as well as elements of digital technology. The integration and application of cognitive and technical skills is referred to as ICT proficiency.

The use of a range of communication tools such as e-mail, video-conferencing and the World Wide Web (WWW) for the location of information, and the subsequent dissemination of information are now reasonably considered to be components of ICT literacy and yet not Necessarily that of computer literacy Oliver & Towers, (2000). In addition, many of the skills, which previously had been associated with those that an individual would need to have acquired in order to be considered computer literate, are often now seen to be components of the more encompassing term of ICT literacy. The Australian Ministerial Council on Education, Employment, Training and Youth Affairs MCEETYA, (2015) defined ICT Literacy as "the ability of individuals to use ICT appropriately to access, manage, integrate and evaluate information, develop new understandings, and communicate with others in order to participate effectively in society" MCEETYA, (2015).

The framework that elaborated this definition referred to six key processes in ICT Literacy: accessing information; managing information; evaluating information; developing new understandings; communicating; and using ICT appropriately. This view of ICT literacy emphasizes the interaction of information literacy with computer technology. Since 2005, ICT literacy has become increasingly regarded as a broad set of generalizable and transferable

capabilities that are used to manage and communicate cross-disciplinary information and the integration of information and technology is seen to transcend the application of ICT within any single learning discipline.

Ogechukwu and Osuagwu (2019) suggest that, "ICT is still in the emerging phase in Nigerian educational system". In their article entitled, 'ICT in Education: Achievements so far in Nigeria', which discusses ICT dimensions, its transforming power; status in Nigerian educational institutions, plus limitations to its infusion, both experts say the country is yet to progress beyond the emerging phase of ICT in education which according to them, is only one of four approaches, the goals of ICT in education embraces. These approaches are: emerging, applying, infusing, and transforming. Ogechukwu and Osuagwu said 90% of Nigeria's educational institutions fall within the emerging phase, 7% in the applying phase and 3% in the infusing and transforming phase, with a few other sectors of the economy having progressed beyond this phase.

In addition, Aduwa and Iyamu, (2015) noted that many developing countries, especially in Africa, are still low in ICT application and use. Thus, it is believed that in order to emerge beyond the first stage in the last three which are termed the 'functional approaches', a lot of policy implementation and funding is required Incredibly, though Nigeria is reputed to have an advantage in this 'begging field', as there are many ICT experts of Nigerian percentage in the diasporas, with no knowledge of any concerted effort being made to genuinely attract their potential to accelerate and sustain ICT development in their fatherland. In order to tap the potentials of ICT, most nations of the world have evolved national information and communication technology polices to serve as a frame for ICT integration in all facets of the society. African countries and particularly Nigeria are not exceptions to this practice Yusuf, (2015). The digital divide between advance and developing

countries, particularly in Africa is well established, like most African countries Nigeria as a nation, came late and slowly in the use of ICT in all sectors of the nation's life.

Although Africa has 12 percent of the total world population the continent has two percent presence in ICT use Jensen. (2012). According to Ajayi (2012) Africa experiences low access to basic ICT equipment, low internet connectivity, low participation, in the development of ICT equipment and even low involvement in software development. New York City has higher internet connectivity than the whole of Africa. The seeming backwardness of the African continent in ICT necessitated a continent-wide initiative, the African information society initiative (Aisi) which had its origin in the African regional symposium on telematic for development held in Addis Ababa in April, (1995). The role of Information and Communication Technologies (ICTs) in the 21st century education system has been described as vital to keeping abreast with rapidly changing technologies. The development of information and communication technology into the Nigerian educational system has come to stay; its importance has been translated into huge potentials in terms of positive outcomes, although investments in ICTs in Nigerian's education system have not yielded much when compared to similar investments made in ICT in other areas (Atureta & Oluwatayo, 2011).

2.5 The Integration of ICT in Education

Integration of Information and Communication Technology into Nigerian Educational System. Nigeria as a nation has recognized the potential of ICT in her educational system. The national policy on computer education emphasized the need for the integration of ICT into the Nigerian educational system. This dates back to the National Policy on Computer Education FME, (1988) which emphasized the need for primary school pupils to be introduced to the basic computer skills,

the use of the computer to facilitate learning and rudimentary use for text writing, computation and data entry. For secondary school, they have related goals which were to be achieved at higher level. The tertiary institutions were also required to teach computer science as a discipline and to integrate it in school administration and instruction. However, the implementation was not effective.

The main purpose of ICT in education is the implementation of ICT equipment and tools in teaching and learning process as a media and methodology, and to familiarize the students with the use and workings of computers, and other related social and ethical issues. ICT has enabled learning through multiple intelligence as it has introduced learning through simulation games; this enables active learning through all senses. Nigeria, shared the multi-purpose application of ICT as he put it "ICT is now regarded as a Utility such as water and electricity and hence has become a major factor in socio-economic development of every nation (Ajayi, 2013). Tinio (2012) noted that ICTs are powerful enabling tools for educational change and reform. When used appropriately, helps to expand access to education, strengthen the relevance of education to the workplace, and raise educational quality by creating an active process connected to real life. ICT greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution and widen the range of opportunity for business.

This new communication tends to reduce the sense of isolation, and open access to knowledge. This is enhanced because ICT provides access anytime and anywhere by making possible asynchronous learning. Online course materials, for example, can be accessed 24 hours a day, 7 days a week. ICT based educational delivery like educational programming broadcast over radio and television also dispenses with the need for all learners and the instructor to be in one location.

In addition, certain types of ICTs such as teleconferencing technologies enable instructions to be received simultaneously by multiple, geographically dispersed learners. Haddad and Draxier (2012) also indicated that ICT has contributed to effective learning through expanding access, promoting efficiency and improving the quality of learning and improving management systems, irrespective of area of specialization of lecturers or students.

According to Obeng (2014), ICT is now regarded as a utility such as water and electricity and hence has become a major role in education, learning and research in general, agriculture, and health and even in poverty alleviation by generating or creating new jobs and investment opportunities. David (2015) said that students become more aware about how to learn when using ICT because they must interact with computer. ICT has also changed the relationship between students and lecturers and has made it open and intimate. The idea of sharing knowledge and the capability of using new resources for learning are enhanced by using ICTs. It has also helped undergraduates in better communication and access to information, this is due to the fact that there is a national policy supporting ICT in schools. It has also helped students' curiosity and motivation that has in turn forced the lecturers to seek more knowledge.

Technology cannot be integrated into class room programs overnight, According to Sandholtz, Ringstaff and Dwyer (2010), Technology Integration includes five stages, entry, adoption, adaptation appropriation and invention. Each stage has its own patterns of change and support requirements: Entry - Instruction is traditional with teacher directed activities. Some common instructional technologies include blackboard, textbooks, workbooks, and overhead projectors. As they began to use computer technologies in the traditional environment, teachers typically encounter problem such as resources management. Technical issues may be demanding. The

support needed for educators at the entry phase includes providing time for planning with peers and opportunities for staff to share experiences with non-participation colleagues.

Adoption - Adoption when teachers move into the adoption phase, they begin to show more concern about how technology can be integrated into daily lesson plans. Traditional group hall lecture and seat work still dominates instructional strategies. Nevertheless, technology is now being used to teach children how to use technology common activities include keyboarding, word processing or drill and practice activities. Teacher began to anticipate problem and develop strategies to solve them. Although technical issues still exist, at this stage the teachers begin to perform basic trouble -shooting on their equipment such as fixing paper jams or changing the ink cat ridge in the printer technical support and training for computer assisted instruction and word processing and practical activities, software programs are necessary at this stage Dwyer, Ringstaff and Sandhooltz, (2010).

Adaptation - Adaptation to and integrated of new technologies into traditional classroom practices, seat work and recitation continues to dominate classroom practices, however during 30% to 40% of the school day students use word processors, databases, some graphics program, and computer assisted instruction packages, productivity is a major theme, students produce faster. Teacher have learned to use computer to save time rather than create additional demands according to Dwyer et al. (2010) there are four support issues first, encourage peer observation and team teaching and develop a flexible schedule that permits these activities, second introduce and discuss alternatives pedagogies, third, because productivity is more important at this stage train staff to use such software tools as spreadsheet, database, graphics hypermedia and e-mail fourth, introduce video discs and scanner.

Appropriation - Is more of milestone than a phase. Personal appropriation of the technology tools by individual students and teachers is the catalyst to this change in technology use. Teacher's personal attitudes towards technology become the benchmark for this milestone in instructional evolution. Teachers understand technologies usefulness, and they apply it effortlessly as a tool to accomplish real work more interaction between students are observed, and student work with computer frequently there is evidence of project-based instruction, collaboration and co-operation and creative schedules. At this milestone routine peer group observation are encourage and group discussions. Discuss alternative assessments, encourage professional growth through conferences and presentations, and finally examine technology integration goals.

Invention - Teacher experiment with new instructional patterns and ways relating to students and other teachers, they reflect on teaching and question of old patterns of instruction. Teacher begins to see knowledge as something children must construct rather than something to be transferred interdisciplinary project-based instruction, team teaching and individually paced instruction are hallmarks of this phase classroom instructions change. Student experts' surface to assist their peers and teachers with technology. Students work together in more collaborative ways to support teachers at this level, advocate collaboration between teachers and encourage teachers to write about and publish their experiences. Create an ongoing support system with others outside the district through e-mail and the internet. Finally, integrators should share their knowledge by monitoring other teachers.

The integration of ICT in teaching and learning process will in no small measure benefit both the teachers and the students. Kwacha (2017) stated that definite and specific reasons for implementing ICT-based technology for teachers and students are:

a) New ICT facilities allow students and teachers to control, manipulate, and contribute information to learning and teaching environments as interactive books, journals and the like are usually made available via Internet;

b) The use of new multimedia technologies and internet will improve the quality of teaching and learning;

c) As a social process, it will facilitate interaction and collaboration not only among learners but among teachers as well, both at local and/or global levels;

d) It will give opportunity to individuals who might wish to combine work and learning at his or her own pace, irrespective of location;

e) It enhances performance of lecturers in time of course materials delivery and provides maximum attention to students as they could meet through e-mail feedback facility or otherwise;

f) It will revolutionize distance learning which used to be “just-in-class” to “just-in-time”, thus enhancing easy accessibility to education;

g) A flexible user interface, since it is attractive and interactive, may motivate the learner’s interest, which in turn will sustain continuous learning;

h) It promotes human resources capable of responding to the demands of the new world economy that is supported and driven by ICT.

In another study conducted by Yusuf (2017) on Trends and Barriers on the Integration of Information and Communication Technology in the Nigerian School System, it has been revealed that impetus for ICT integration in the Nigerian school system which came up in 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 from the total national budget for articulating the vision of the document. The Nigerian National Policy on ICT FGN, (2001) has within its purview the vision, mission, general objectives and strategies for the implementation of the policy, and sectoral 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.

There are two broad classes of computer applications in education, and they include computer assisted learning (CAL) and computer managed learning (CML). Computers in computer assisted learning are used as learning resources. Computer assisted learning uses the computer directly as a medium of instruction and as information delivery system. Computer assisted learning is adaptable to any number of instructional situations since it has an ability to engage in instructional 'dialogue' with the student while delivering information. Duke (2010) explained that in computer assisted learning, the computer presents frames of information and questions, or the computer could contain a model of environment that teachers and learners can manipulate and explore. The computer can act as a tool for the learner in the manner of a microscope or logarithms table; it can also store some or all of the teaching materials in a given course. In fact, most of the computers can process programmes that have developed over the years.

ICT is having a revolutionary impact on education methodology globally. However, this revolution is not widespread, and strengthened to reach a large percentage of the population. In a complex society like Nigeria many factors affect its ICTs use and integration, so an interdisciplinary and integral approach is very necessary to ensure the successful development of Nigeria's economy and society. He also opined that ICT can make the school more effective and productive thereby engendering a variety of tool to enhance and facilitate teachers' professional activities. It has also been pointed out that ICT can enhance teaching and learning through its dynamic interactive and engaging content and can provide real opportunities for individual instruction (Ololube, 2016). ICT integration in education should be parallel with teacher's professional development. The school leadership also play a key role in the integration of ICT in education, lack of support from the school administration is also a big challenge. Thus, for effectiveness of ICT integration administrators must be competent and have a broad understanding of the technical curricular, administrative financial and social dimensions of ICT use in education.

2.6 Problems of ICT in Nigerian Higher Institutions of Learning

The introduction and subsequent development of Information and Communication Technology in Nigeria is not without problems and challenges. As such hitches and drawbacks have been part of the ICT in almost all sectors of the country. Educational institutions also have their share of these quandaries. This is visible in a great number of outcomes of studies conducted by many researchers. For instance, Ololube (2016) in a study on secondary school teachers' ICT competency in Nigeria observed that Some teachers in Nigerian secondary schools find it very difficult to effectively tally their ICT instructional materials such as computers, audio visual aids, slides, video clip, electronic white boards, and electronic conferencing materials and so on, to the goals of their instructional objectives, which instigate information search and attribution formulation.

Olakulehin (2017) observed that across Africa and most developing countries of the world, Nigeria inclusive there are a deluge of challenges confronting the application of ICTs in teacher training and in the educative process in general. These challenges include limited ICT infrastructures in terms of facilities and competent staff; lack of information and information illiteracy in teachers and teacher trainers-technophobia; poor or nonexistent internet connectivity; inadequate learning resources including related educational tools, course curriculum and other learning materials; attitudes of teacher-trainees and teacher trainers which indicates a gross lacking in independent learning skills and reluctance to take responsibility for their own learning; software license and highly prohibitive costs associated with the; maintenance and technical support as well as poor power supply in most parts the developing regions of the world, a problem that is peculiar to Nigeria in particular.

Adedoyin (2018) have identified some problems associated with the use of ICT in Nigeria as high incidence of poverty, poor funding by the governments, lack of knowledge and expertise in the use of the new technology and poor condition of infrastructure especially electricity. Shafika (2017) also highlighted other challenges facing ICT operations in Africa, these are poor electricity supply, lack of ICT equipment, overcrowding of computer laboratories, and lack of affordable access to connectivity with acceptable bandwidth, lack of local digital content especially in terms of language, cost of maintaining equipment, staff training shortage of skills and general dependence on donors for the implementation of policy.

Atureta and Oluwatayo, (2011) in their views said, factors militating against full implementation of ICT are insufficient numbers of computers, epileptic power supply, problems of internet network failure, lack of ICT knowledge/skills, difficulty in integrating ICT to instruction, scheduling computer time, insufficient peripheral devices, inadequate software, insufficient teaching time, inadequate access, lack of qualified ICT personnel, cost of equipment, management attitude, there seems to be no clear and definite policy and/or curriculum for all levels of the Nigerian education system, and lack of technical assistance among others. Despite the keenness of some institutions of higher learning to establish effective ICT education programs, they are confronted with enormous problems that may impede the proper implementation of these programs. The most significant of these is poor ICT penetration and usage among Nigerian higher education practitioners.

Almost all African countries' basic ICT infrastructures are inadequate, there is also lack of electricity to power the ICT materials and poor telecommunication facilities. Above all, this lack of access to much needed infrastructure is to the result of insufficient funds. Several cities and rural areas in Nigeria still have fluctuation in their supply of electricity which makes the implementation of ICT in education most difficult. Additionally, most Nigerian universities do not have access to basic instructional technology facilities, which also makes the integration of instructional technology in the delivery of quality education difficult. (Ololube, Ubogu & Ossai, 2017).

Poor economic conditions and their effect on middle level manpower stand as a major barrier to the implementation of ICTs in higher education. Even an average middle-income earner cannot afford basic technological communication gadgets. Thus, computer related telecommunication facilities might not be overly useful for most Nigerian students and faculty members, as computers are still very much a luxury in institutions, offices and homes. This has made the integration of necessary on-line resources e-mail, world-wide-web, etc. into higher education as most difficult. Ololube, et al (2017). For example, in an African survey of ten countries, Botswana has the highest fixed line household penetration while Uganda trails far behind the rest, with penetration under 1 percent.

Achimugu et. al. (2010) outlined Challenges Facing ICT Utilization in Nigerian Tertiary Institutions. This can be broadly grouped into four categories; namely:

a) Inadequate Infrastructure;
b) Inadequate Skilled Manpower;
c) Resistance to Change;
d) Inadequate Funding; and
a) Inadequate Infrastructure.

Tertiary institutions in Nigeria lack adequate ICT infrastructure to effectively tap into the opportunities offered by the cyberspace. Personal Computers (PCs) are available in most Nigerian tertiary institutions, but they are not readily accessible to students because of the low computer (PC): student ratio which is averagely put at about 1 to 40. In most cases, the basic software needed for practical works are not available and where they are available, they are not accessible because of the low ratio. There is also the lack of Computer Aided Interaction and other specialized software to support some areas of teaching, learning and research. Internet connectivity is available in most tertiary institutions in Nigeria, but in most cases the bandwidth subscribed to which

determines speed of access is too small to support any meaningful academic activity during peak period. Some institutions have subscribed to Virtual Library sites whereby members can access electronic academic materials such as journals.

Lack of finance and distributive capacity are some of the major dilemmas in the utilization of information and communication technology, Nigeria has not been able to employ qualified ICT teachers, and provided resources to keep up with this demand. This brings about compromised quality of education. Many Nigerian higher institutions are faced with predicament of educational expansion that corresponds with economic development. Information and communication technology can play a very significant role in equalizing opportunities for marginalized groups, communities and universities. But the paradox is that for those groups' communities and higher institutions that are unable to cross the information and communication technology, is yet another means to further marginalize them. Education has a major role to play in resolving this problem. Until information and communication technology become part of both the delivery and content of education, the disadvantage will deepen and development will suffer.

Countries must be able to benefit from technological developments. To be able to do so, a cadre of professionals has to be educated with sound ICT backgrounds, independent of specific computer platforms or software environments. From the foregoing it is distressing to observe that Nigeria and many other countries in sub-Saharan Africa fall below expectations regarding the use of ICTs in general and particularly in instructional/ learning activities. The disparity in access to information and communications technology in Africa is occasioned by many and diverse problems, including, low bandwidth for internet access, lack of funds to embark on full scale computerization, irregular supply of power, inadequate functional telephone lines and other infrastructural facilities needed to support the efficient and effective introduction and development

of the technology. Nigeria is also short of manpower for effective utilization of software and for maintenance.

Qualified programmers, engineers and technicians are equally difficult to find and when they are found, the public education sector cannot afford to retain them, as competition from the private sector is fierce (Olakulehin, 2017). This lack of manpower breeds a compendium of other problems. Teachers can only pass on skills and ideas to the learners, if they are masters of their trade, and they are at the cutting-edge of knowledge and developments in their disciplines. This is, unfortunately not the case here in Nigeria, most teachers at all sectors of the education system have minimal or no ICT skills and hardly use existing opportunities to develop them. But this generation cannot survive the challenges posited by the contemporary social realities with this level of ignorance, technophobia and information paranoia of the teaching force. This development, therefore calls for a re-thinking of the strategies that are adopted for teacher production in order to enhance the drive towards sustainable development (Olakulehin, 2017).

Though government efforts have not gone without much notice toward the implementation of ICT in Nigerian educational institutions, the challenges are there from paucity of funds and lack of access, to unsteady power not all local ISPs Internet Services providers can maintain their boosters for 24-hours without fuel which is costly and high cost of ownership with the rapid increase in population and demands across the service sectors, there is the growing realization that in this 21st century, the government of Nigeria alone can no longer fund education and its concerns except by partnering with the private sector Aduwa and (Iyamu 2015). ICT in educational programs which require large capital investment and developing countries need to predict the benefit of ICT use to balance the cost relative to the existing alternatives, potential sources of money and resources, for ICT use programs which include public subsidies, fund raising events support from volunteers,

community support, revenues earned from core businesses. Overcoming the mentioned challenges may help educational systems benefits from this technology.

2.7 Review of Empirical Studies

Akuegwu & Ntukidem (2017) in their study investigated Information and Communication Technology (ICT) facilities utilization for quality instruction service delivery among universities lecturers in Nigeria with focus on Akwa Ibom and Cross River States. A total of 400 lecturers were selected for the study using stratified random sampling technique. Four hypotheses were postulated to give direction to the study. Data collection was carried out with the instrument called ICT Utilization for Instructional Service Delivery Questionnaire (I.U.I.S.D.Q.) t-test and independent t-test statistical analyses were used to test the hypotheses. Results obtained revealed that availability of ICT facilities for quality instructional service delivery in Universities in Akwa Ibom and Cross River States, Nigeria is significantly low except internet-connected desktop computers and institutional cyber cafes; lecturers' utilization of ICT facilities is significantly low; lecturers from federal universities in the two states utilize ICT facilities more than their state universities counterparts. Lecturers from universities in Akwa Ibom State differed significantly with their Cross River State counterparts in their utilization of some of the ICT facilities. Thus, recommendations were made to enhance the provision and utilization of ICT facilities in Nigerian universities.

Egomo, Enyi and Tah (2012) conducted a study that investigated the accessed, availability and degree of utilization of ICT tools for effective instructional delivery in tertiary institutions in Cross River State. Lecturers selected for the study 300 were using simple random sampling. Four research questions were formulated to guide the study. A questionnaire titled "Availability and

Utilization of ICT tools for effective instructional delivery in tertiary institutions in Cross River State was the only instrument used for data collection (ICTTEIDQ)". The questions were statistically analyzed using simple percentage. The results obtained revealed that availability and utilization of ICT tools for effective instructional delivery is significantly low. Cyber Cafes, internet connectivity and use of lap tops is a common phenomenon among institutions and lecturers. Competence in the use of ICT tools among lecturers is discouraging. However, lecturers from University of Calabar differed significantly with their counterparts from Nuga Polytechnic and colleges of education in terms of utilization and competence of ICT tools. Recommendations were made to enhance the provision and utilization of ICT tools in tertiary institutions in Cross River State.

Azuh and Ndidi (2013), in their research examined the academic staff challenges to effective utilization in teaching and learning of agricultural education in federal universities in south east geopolitical zones of Nigeria. Forty respondents were randomly sampled from universities and used for the study A35 item research developed questionnaire was used for data collection, means and grand means were used to analyze the research questions. The findings revealed a low extent utilization and inadequate Information and Communication Technology tools literacy among the academic staff in the federal universities in south east geopolitical zone. Recommendations were made for lecturers to be ICT literate for effective ICT utilization in their universities.

Adamu (2012) in his research investigated the availability, accessibility and usage of information and communication technology (ICT) among students of technical education in Niger State tertiary institutions. The study adopted survey research design with a structured questionnaire consisting of 40 items developed by the researcher for data collection. The population of the study comprised of all the 1161 students of technical education department from the two tertiary institutions offering

technical education programmes in Niger State. Four research questions were formulated to guide the study. The findings of the study revealed among others that ICT facilities are not available for students use at the department and as such they don't have access to it. In terms of usage, the students mostly use commercial cybercafés for the purpose of schools' registration and thus there is poor usage of ICT for academic learning. Some recommendations were made in line with the findings which among others include the urgent need for the department to make ICT available and easily assessable for the students and also the need to mandate students to create email address and also present assignments/ course projects through power point projector.

Tella (2011), in his study investigated the level of availability and utilization of ICT facilities among students in some south-western Nigeria colleges of education. The data for the study were gathered through a two-page questionnaire administered on the 200 sample respondents who were accessible in the school of education in all the colleges of education in the south-western part of Nigeria. The data were analyzed quantitatively using it revealed low level of ICT facilities utilization and the non-availability of ICT equipment and that the respondents were disgruntled with the sluggish use and integration of ICT. It is recommended that ICT facilities should be made available for effective teaching available facilities and learning.

Archibong, Ogbiji and Anjijaobi-Idem (2010). In their study examined ICT competence and challenges to ICT utilization among academic staff. Six research questions were posed to guide the study and a questionnaire was developed, validated and used for data collection from a sample size of 300 academic staff. The collected data were analyzed using descriptive statistics (percentages). The results show that majority of the academic staff funded their ICT training; high number of them have laptops; access to internet was mainly at public cybercafé; majority (53.3%) rated their ICT competence as low. Inadequate ICT facilities, excess work load and funding were

identified as major challenges to ICT usage among academic staff. Recommendations made include funding of ICT training of academic staff by the university management and making ICT training mandatory for all academic staff.

Amaechi and Josephine (2010) in their study investigated the availability and utilization of new technological resources for science curriculum delivery in Nigeria universities. The purpose of the study was to appraise the availability and utilization of new technological resources. A descriptive survey was used. The population comprised all science lecturers in four federal and five state-owned universities in South- East states of Nigeria. 78 science lecturers from federal and 62 from state universities formed the sample. Stratified random sampling and census techniques were used to select the sample. The instrument was a 36-item questionnaire developed by the researchers. The instrument was validated and reliability coefficient computed. Three research questions and three hypotheses guided the study. Data were analyzed using means, standard deviation and t-test statistics of $p< 0.05$. Results showed that some new technological resources are available. On the other hand, all the listed new technological resources were under-utilized. Implications of practice for sustainable development was proffered and recommendations were made among which is that federal and state governments should provide adequate quantity of new technological devices.

Gambari, and Okoli (2017) in their study surveyed the availability and utilization of Information and Communication Technology (ICT) in tertiary institutions in Niger State. To elicit responses for the study, four research questions were raised and three hypotheses formulated. One hundred and fifty lecturers, 90 males and 60 females were randomly drawn from three federal tertiary institutions in Niger State to participate in the study. Data was collected for the study through the administration of 35 – item questionnaire to respondents. A test re-test method was used to determine the reliability of the instrument, the result was appropriately scored. The data obtained

were analysed using mean to analyse the questionnaire respondents while ANOVA was used to analysed the hypotheses. The findings showed that there was inadequate provision of ICT facilities in federal higher institutions in Niger State and that there is no significant difference between the availability and extent of effective use of ICT facilities and equipment for teaching and research purposes. It was recommended among other things, that there should be adequate provision of ICT facilities and equipment in the tertiary institutions, the existing ICT facilities and equipment should be judiciously used for effective teaching and research purposes. The implications of major findings were discussed and recommendations were made for the availability and utilization of ICTs in higher institutions in Nigeria.

Akindoju, Nwagwu, (2014) in their study determined the extent to which ICT resources are adequately provided and utilized by computer science lecturers for instructional delivery in Nigerian tertiary institutions. Thirty science educators were randomly selected from the faculties of science and science and technology education in two universities in Lagos state. Teacher' utilization of ICT resources questionnaire was used for data collection. Data were analyzed using bar chart and percentage. The finding shows that ICT resources are not adequate and many of the educators rarely use the available ICT resources for relevant instructional delivery. Suggestions were made for improvement.

Onasanya, Shehu, and Ogunlade (2011) investigated science and health education teacher's awareness and extent of utilization of information communication technologies. It also examined the relationship between awareness, extent of utilization and teachers' gender. The research subjects were 240 science and health education teachers drawn from 40 secondary schools, randomly selected from 10 Local Government Areas of Oyo State. Two instruments were designed by the researcher and used for this study. These are 40 item computer literacy test (with reliability

coefficient measure of 0.77) and the 20-item questionnaire on teachers' level of utilization of ICT's with Cronbach alpha measure of 0.82. Data were analyzed using weighed means scores standard deviation and t-test. The analysis that the level of computer literacy of the science teachers examined is low.

Their level of utilization of ICT resources was also found to be very low. From the 2 hypotheses tested, the result showed that there was significant difference between the mean scores for male and female science teachers in their level of (1) computer literacy (knowledge, t = 6.48; application, t = 3.62, application t = 3.34 and communication, t = 2.63) and (2) utilization of ICT's (t = 4.00). It also indicated that the males outperformed their female counterparts in both instances, although, their level is very low. Therefore, all science teachers (especially the females) need to be motivated and provided with relevant ICT training experiences (at pre-service and in-service levels) in order to enhance their instructional delivery productivity. Recommendations and classroom implications were subsequently drawn for effective computer and science education.

Adetimirin (2012) in his study investigated the availability, use of Information and Communication Technology and the ICT literacy skills of undergraduates in seven Nigerian universities. The descriptive survey research design was adopted and seven universities were selected based on distribution of ownership of university. Four faculties were purposively selected with a study population of 8,497. Random sampling procedure was employed using a sampling percentage of 20% to give a sample size of 1,702. Results revealed that computer, telephone and the Internet were the three ICT mostly used by the undergraduates, although more on an occasional basis. The undergraduates in the state universities (BSU and IMSU) were found to have poor ICT literacy skills in the use of the three ICT with over 25%, while those with average ICT literacy skills were in the federal universities (ABU and UNIMAID). Three major factors affecting the ICT literacy of

the undergraduates were identified as irregular power supply, inadequate ICT and limited duration of the use of the ICT. Recommendations were for increased ICT literacy of undergraduates; the university administrators must introduce courses on ICT competency to all students especially first year students and encourage all lecturers to use ICT for teaching and learning.

Aina, Adigun, Taiwo and Ogundipe (2010), in their study involved a survey to examine the ICT resource support availability, utilization and proficiency among university libraries in Nigeria, with special reference to Lagos State University (LASU). The population for the study consisted of 240 sample respondents. Data were collected through a 20 items questionnaire constructed and validated with a reliability coefficient of 0.68. The data collected were analyzed using the frequency count and $\chi 2$ -test. The findings revealed that the ICT resource support availability in the university was adequate; the actual use of ICT was to search for journal articles, to access reference materials, to conduct research and to send e-mails. However, patrons' proficiency was inadequate. The constraints on the use of ICT resource support were also significant. It is therefore recommended that libraries in Nigeria take advantage of these technologies, invest more on latest ICT resources, organize training programs and catch up with the technological world.

Markauskaite (2015) in her study explored the differences in trainee teachers ICT literacy: Does gender matter? She Investigated gender differences in self-reported ICT experience and ICT literacy among first year graduate trainee teachers. Dynamic model of ICT literacy was employed. Three main components of aspiring teachers ICT literacy are covered: (1) present general problem-solving and technical ICT capabilities; (2) situational and longitudinal sustainability; and (3) transferability of ICT capabilities into future professional domain. No significant differences were found between females and males previous experience with ICT. However, males on average worked with computers significantly more hours per week than females. Significant differences

between males and females' technical ICT capabilities and situational and longitudinal sustainability were observed. Males scores were higher. In the regression analysis, when the impact of the background and ICT experience variables was controlled, gender failed to be a significant predictor of the sustainability scores. However, it remained a significant predictor of some trainee teachers scores, related to their technical ICT capabilities. Recommendations were made that female students need to be motivated and provided with the relevant ICT training.

Patrick, Benwari and Nnenna (2014) investigated the effect of gender, socio-economic status and settings on computer literacy among undergraduate students in Nigeria universities. 300 undergraduate students were randomly selected form 3 universities in the geo-political zones in the southern Nigeria. A questionnaire containing 20 items was drawn in line with the 3 hypotheses raised for the study. The instrument was validated by experts in test and evaluation as well as Higher Education administration experts. The reliability of the instrument was established using the test-re-test method. The data collected was analyzed using the Pearson Product Moment correlation coefficient statistic and it was established at 0.86 which shows that the instrument is reliable. The 3 hypotheses were analyzed using the t-test statistical method. The study shows that there is a significantly difference between male and female undergraduate students in computer literacy. The socio-economic status of students affects their exposure to computer recourses. There is a significant difference between students brought up in urban and rural settings in their exposure and use of the computers. Plausible suggestions were made if computer literacy is to be given a pride of pace among undergraduate student.

Adetimirin (2013) investigated the influence of gender on the use of ICT among undergraduates in two university libraries in Nigeria. Undergraduates from three faculties were randomly selected to give a sample of 223, which is 30% fraction of the total population of 12,353. Questionnaire was the data collection method used. The undergraduates used ICT for research purpose and to support course of study. ICT use was higher among the undergraduates in Lead City University than those in University of Ibadan. ICT use was influenced by gender in both universities. Recommendations were based on the outcome of this study is that for increased use of ICT, library administrators must provide more infrastructural support, ICT facilities and training to improve the ICT literacy skills of undergraduates and reduce gender influence.

Samuel (2013) investigated whether gender affects the use of Information and Communication Technology (ICT) facilities among academics. The study used a survey approach that involved questionnaires to solicit data from 154 academics. For the past few years, an assortment of ICT facilities such as computers, laptops, projectors, printers and many others have been available to academics for accessibility and use in collaboration, teacher-student communication, online assignment, research, teaching and learning. Using the t-test analysis, access rates and use of ICT among male and female academics was observed to be insignificant. Again, the findings revealed a significant difference between male and female academics on 'ICT increasing collaboration with other tertiary faculty members', 'performing information/data management activities' and 'accomplishing tasks more quickly'. Strategies have been suggested to utilize ICT in educational institutions include improving on ICT infrastructure, provision of a policy environment, increasing Internet bandwidth, providing alternative power supply, improving on ICT infrastructure, enhancing ICT training programs, recruiting more ICT personnel and collaboration between academics and industry.

Ige and Orungbemi (2013) conducted a survey study of descriptive type and she investigated the measured effect of gender and computer literacy on students' academic achievement in Social Studies and Civic Education in selected secondary schools in Ondo State, Nigeria. Specifically, the study sought to determine the influence of gender and computer literacy on students' academic achievement in Social Studies and Civic Education. The population consisted of two hundred and fifty students selected from ten secondary schools in Ondo State. The selected students responded to the Computer Literacy Test (CLT) and Social Studies and Civic Education Test (SSCET), which had reliability of 0.78. Data collected were analyzed using: percentage, mean, standard deviation and multiple regression analysis. The results showed that 16% of the students had low computer literacy skills, 36% and 48% had average and high computer literacy skills respectively. There was a joint relationship between the independent variables (gender and computer literacy) and dependent variable academic achievement in social studies and civic education. The independent variables accounted for 12.7% of total variance in the academic achievement of the students. Gender and computer literacy also had significant relative influence on academic achievement of the students, while there was a significant difference in the achievement of low, average, and high computer literate students. Based on the results of the study, it was suggested that scholars should study factors that influence students' academic achievement in all disciplines, consequent on the need to train globally competent students that can function effectively in the information age.

Oyeniyi and Dike (2013), in their study of gender difference in Information and Communication Technology skills and utilization among lecturers in south western zone Nigeria. The study was a descriptive study. The sample was selected using simple random sampling. The data was collected using structured questionnaires data. Data was analyzed using simple percentage and inferential statistics of t-test and correlation analysis were used for data analysis, the findings revealed that

gender differences exist between male and female lecturers on their Information and Communication Technology literacy, and there is no significant difference on lecturers' utilization of Information and Communication Technology. Recommendations were made to improve the ICT literacy of female lecturers.

Nsibrano (2019), in her study of Him and Her gender differentials in ICT uptake, investigated the influence of gender and Information and Communication Technology utilization in some selected universities. The study was a descriptive survey that was conducted in Uganda with one public and one private university. That is Makerere University and Uganda Christian University, Mukono the population of the study was 240 and simple random sampling was used to select the sample of 120 undergraduates 30 females and 30 males from each of the two universities. The findings revealed that the ratio of male to female students in the Information and Communication Technology Utilization programs is 3:1 in favour of male. Recommendations were made to organize training for the female students.

In her study Anunobi (2014), investigated the information and communication technology literacy level among student-teachers in universities in north central Nigeria, as well as the influence of gender/areas of specialization on the student-teachers level of ICT literacy. The study was a descriptive survey type. A total of 638 student-teachers were sampled using stratified random sampling technique. Research question one (1) was answered using mean, hypothesis 1 was tested using t-test, while hypothesis 2 was tested using analysis of variance (ANOVA). The findings of the research showed that university student-teachers in North Central Nigeria are average in their level of ICT literacy. There was also no significant difference established in the level of ICT literacy between male and female student-teachers and neither was there any significant difference in the level of ICT literacy by student-teachers in Arts, Sciences, and Social Sciences. The

implication of the findings is that there is need for improvement in ICT literacy level of student-teachers to enhance efficient use of ICTs in the discharge of their duties as professional teachers and recommended provision of computers at all level of education so as to ensure that all students have access to computer.

Tonubari, (2012). In her study investigated the level of computer literacy amongst trainee teachers in a Nigerian University of Education. The study utilized the survey design; one research question and three hypotheses guided the study. Stratified random sampling method was used to draw a sample of two hundred and forty (240) students (trainee teachers) from four faculties in the institution. The survey utilized self-report questionnaires Computer Literacy questionnaire developed by the researchers and validated by ICT Education experts at the university's ICT Centre. The major findings of the study are that the level of computer literacy amongst trainee teachers in Rivers State University of Education is generally low, especially among fresh students. The male trainee teachers are more adept at skills and literacy in ICT than their female counterparts. The level of computer literacy and skills amongst trainee teachers was not dependent on their course of study. Recommendations given include provision of computers at all levels of education so as to ensure that all students have access to computers, Government and stakeholders in education should partner together with NGOs to not only to introduce the use of computers in schools but also provide the manpower required to impart skills on computer usage, provide access to the internet and encourage the use of ICT.

Bassey, Akuegwu and Ntukidem, (2007), in their study examined the ICT usage habits of students in teacher preparation programmes, it also examined, the self-assessed ICT skills' competencies possessed by students in teacher preparation programmes, and determine whether there were significant differences in perceived ICT competencies among students in teacher preparation

programmes in the University of Benin, according to demographic and study related factors gender, and type of computer training and the target population was all students in levels 200, 300, and 400 of the Faculty of Education, University of Benin. The instrument for data collection was a researcher designed questionnaire. The result shows that: Students' ICT usage was low, particularly the use of internet and email. The respondents perceived themselves to be good in word processing and file navigation, moderate in Internet browsing and emailing. Only two percent (2%) of the respondents perceived themselves to be competent in PowerPoint with about seventy percent (70%) having no capability at all.

There was no significant difference in the perceived competency among students according to gender and academic year/level. However, there was significant difference in the perceived competency among students according to the type of computer training, with those with formal computer training perceiving themselves to be most competent in ICT skills. From the findings, the lack of access to computers and Internet connectivity within the faculty present a serious issue affecting staff and students' use of ICT applications. It is therefore recommended that government should make funds available for the provision of ICT infrastructure in tertiary institutions in the country. Also, special funds should be set aside to revamp the e-learning centres at the faculty level for students and faculty/staff use.

2.8 Summary of Literature Reviewed

The related literature review in this work has provided an in-depth knowledge on the various parameters involved in this study which include ICT, teacher education programmes, ICT literacy in Nigerian higher institutions, meaning and concept of ICT, problems of ICT in Nigeria and globally, etc. This review has contributed immensely in giving this study a focus. The review

explored the various definitions, meaning and concepts of ICT by various scholars. Such definitions include the definition of ICT by Milken exchange which said, “Information and Communication Technology (ICT) is defined as computer-based tools used by people to work with the information and communication processing needs of an organization. It encompasses the computer hardware and software, the network and several other devices (video, audio, photography camera, etc.) that convert information (text), images, sound, motion, and so on into common digital form (Milken Exchange on Education Technology, 1999).

Tinio (2012) noted that ICTs are powerful enabling tools for educational change and reform. When used appropriately, helps to expand access to education, strengthen the relevance of education to the workplace, and raise educational quality by creating an active process connected to real life. ICT greatly facilitate the acquisition and absorption of knowledge, offering developing countries unprecedented opportunities to enhance educational systems, improve policy formulation and execution and widen the range of opportunity for business. This new communication tends to reduce the sense of isolation, and open access to knowledge. This is enhanced because ICT provides access anytime and anywhere by making possible asynchronous learning. Online course materials, for example, can be accessed 24 hours a day, 7 days a week. ICT based educational delivery like educational programming broadcast over radio and television also dispenses with the need for all learners and the instructor to be in one location.

CHAPTER THREE

METHODOLOGY

3.1 Introduction

In this section, the design that has been applied in conducting the study, the population, the sample and the sampling techniques that have been applied in drawing the samples have been explained. Similarly, the chapter elucidates on the instruments that have been used in collecting the data, the techniques applied in establishing the validity and reliability of the instrument, data collection procedure, as well as the procedure for data analyses.

3.2 Research Design

This study adopted a descriptive survey research design. The survey research design involves a fairly large number of respondents and it is relevant in terms of efficiency and usefulness for collecting data. It is also explained in Abdullahi (2010) that in a descriptive survey research, data is collected with the intention of either describing the nature of the existing condition, identifying standards against which existing condition can be compared or determining the relationships that exists between specific events. Bichi (2014) explained that descriptive research has been defined as a situation where the investigator collects data on two or more variables, and through statistical analyses determine the type of relationships that exist between them. Therefore, this study is aimed at describing the current nature of the ICT literacy level of the lecturers, the availability of ICT facilities, and the level of ICT utilization among the lecturers of polytechnics in Osun State.

3.3 Population of the Study

The population in this context refers to the entire body that constitutes the research subject. Bichi, (2014) explained that population is not everybody, but everybody falling into the category whose characteristics is being studied. The population of this study comprises all the lecturers of polytechnics in Osun State. There are nine (9) Polytechnics in Osun State and they are: The Polytechnic, Ile Ife; Federal Polytechnic Ede; Osun State Polytechnic, Iree; The Polytechnic Iresi; Igbajo Polytechnic, Igbajo; Wolex Polytechnic, Iwo; Villanova Polytechnic, Imesi-Ile; Interlink Polytechnic, Ijebu-Jesa; and I-CON Universal Polytechnic, Osogbo. In total, there are One-Thousand-Nine-Hundred and Fifty-Nine Lecturers (1,959) in all the polytechnics.

3.4 Sample Size and Sampling Technique

In order to select the desired sample from the population of this study; two sampling procedures were employed namely proportionate and simple random sampling techniques. Bearing in mind the nature of the population, that is lecturers. From each layer of the population, proportionate sampling technique was employed to select sample in relation to its larger population; thus, in each polytechnic visited a sample of lecturers were drawn proportionately. Whereas, in ensuring that each member was given equal chance for inclusion in the sample, use of table of random numbers which is a method of simple random sampling technique was adopted. Subjects were assigned identification number in relation to the table numbers, thus selected constituted the required number of subjects for lecturers respectively in each polytechnic visited.

For the purpose of this study all the lecturers are element of the study procedures, since the polytechnics are scattered in cities/towns in the state with a large number of populations. The lectures are one-thousand-nine-hundred and fifty-nine (1,959). As such a representative sample were systematically selected using (Kreycie and Morgan Table, 2006) for determining population and sample size in which three-hundred and twenty-two (322) lecturers were selected and used for this study.

3.5 Research Instrument

To achieve the objectives of this study, primary data was obtained directly from the research subjects. The instruments used to collect data for this study was questionnaire. The reason for selecting questionnaire in this study is that in a questionnaire, large amount of information can be collected from a large number of people in a short period of time and the result of the questionnaires can usually be quickly and easily be quantified by either a researcher or through the use of a software package. Another reason for selecting questionnaire is that it can be used to compare and contrast other researches (Taylor 2004). The instrument was meant to elicit information from the respondents about their ICT literacy level, and the availability and utilization of ICT facilities in the nine polytechnics in Osun State. It was divided into four (4) sections A, B, C, and D. Section A: this section is concerned with lecturer's background information which includes the name of their colleges and gender. Section B-D: these sections are designed to illicit information from the respondents based on the research questions.

3.6 Validation and Reliability of Instrument

For a study to be acceptable as a scientific or empirical, the research instrument must exhibit appreciable measures of validity and reliability. Olaofe (2010) asserted that content validity is the adequate coverage of the content of the research topic in terms of the variables of the research topic, it is also determined by table of specification which ensure equitable coverage of the items or variables of the study. Gray, Mills and Aikasian (2019) maintained that content validity is determined by expert judgement and there is no formula or statistics by which it can be computed and there is no way to express it quantitatively. To this effect, content validation is usually carried out by face validation and review of items as well as procedure for construction of the items. This process is heavily subjective. To establish the validity of the instruments of this study, the questionnaires were presented to the researcher's supervisor for perusing. The supervisor perused the clarity of the items by rating how relevant, how understandable, and how comprehensible the items are, scrutinized the questionnaires and made necessary corrections to ensure that the instruments have actually covered the content of the research topic as well as all the variables under study.

To ensure the reliability of the instrument, test-retest method was applied, also known as coefficient of reliability in order to establish the reliability of the two instruments. Olaofe (2010) postulated that split half reliability is a process whereby a test is administered to the whole group and scores of the half of the test is correlated with those of the second half for each member of the group. To ascertain the reliability of the instruments, a pilot study was conducted in Federal Polytechnic Ede which was part of the population to establish the reliability of the lecturers' questionnaires. Twenty (20) lecturers were randomly selected, using simple random sampling method to conduct the pilot test in which split half method was applied. After single administration

of the questionnaires to the subjects on the selected sample of the pilot study the researcher subjected the responses of the lecturers, questionnaires to Guttmann's coefficients of reliability scale test. The coefficient reliability of the lecturer's questionnaire after subjecting it to split half method due to single administration of the instruments was found to be 0.801. The result showed that the instrument has appreciable measures of reliability.

3.7 Method of Data Collection

In collecting data for this study, the researcher collected an introductory letter from the Department which was used as evidence of studentship for information gathering in the respected polytechnics, researcher established rapport with the HODs in the polytechnics visited. This was in a view to help them understand the rationale behind the visit and that the information needed from lecturers is for research purpose only and all information gathered will be treated with utmost confidentiality. For this reason, the researcher first visited the polytechnics to seek permission and requested an appropriate date and convenience from the polytechnic authority, lecturers for the administration of the questionnaires. A date was fixed for administering the questionnaires. The questionnaires were administered to the lecturers with the help of research assistant from each polytechnic.

3.8 Method of Data Analysis

The technique used in the analysis of data collected was through a survey study using descriptive statistics and inferential statistics to analyze the data. The completed questionnaires were retrieved from the field. The data was then converted into a program entitled Statistical Package for Social Studies (SPSS) version 16.0. It produced both numerical and tabulated results of the study. The data were analyzed using both descriptive and inferential statistics. Frequency distribution table

and chi-square statistical tool were used to analyze the data which was in numerical forms and was computed separately. Chi-square test is a method of analysis that can be used to assess the deviation of observed frequency from a set of expected frequencies when a category represents a single dimension (Bichi, 2014). Frequency distribution table and simple percentage was used to answer the research questions. The chi-square instruments used in this study seeks to measure the lecturers' gender in relation to their ICT literacy level and how it deviates from the expected frequencies. Therefore, chi-square is quite relevant. Here the responses were tabulated in accordance with the expected frequencies and obtained frequencies.

3.9 Ethical Considerations

Every research must comply with already existing ethical rules. The researcher followed the rule and ethics of research by not plagiarizing any literature. Authors in every literature used were referenced adequately. The researcher would keep promises and agreement act with sincere actions, the researcher would also keep records of research activity such as; data collection, research design and correspondence with journal.

CHAPTER FOUR

DATA ANALYSIS, PRESENTATION AND DISCUSSIONS

4.1 Introduction

This chapter presents the data analysis and interpretation of the results collected for the study. The interpretation is presented based on two statistical tools. Frequency distribution tables which provide information on both demographic variables and research questions.

4.2 Gender of the Respondents

Table 4.1: Distribution of the respondents by gender

Gender	Frequency	Percentage
Male	192	59.6
Female	130	40.4
Total	**322**	**100.0**

It is clear from table 4.1 that one-hundred and ninety-two (192) respondents, consisting 59.6% of the respondents were males, while one hundred and thirty (130) respondents consisting 40.4% of the respondents were females. This concludes that male lecturers have higher number of respondents with one-hundred and ninety-two 192 (56.6) respondents.

4.3 Analysis of Research Questions

Data presentation and analysis of research questions in the table forms are as follows:

Table 4.2: What is the ICT literacy levels among lecturers in polytechnics?

Lecturers' Literacy Levels	Frequency	Percentage
No Competence	20	6.2
Know the Basics	79	24.5
Moderately Skilled	142	44.1
Advanced	81	25.2
TOTAL	**322**	**100**

Table 4.2 presents the frequency and percentage of the lecturers ICT literacy level from the selected polytechnics in Osun State. Twenty (20) 6.2% of the respondents said they have no competence, seventy-nine (79) 24.5% know the basics, while one hundred and forty-two (142) 44.1% are moderately skilled. And eighty-one (81) 25.2% were in advanced level of ICT literacy. This concludes that higher number of respondents were in moderately skilled level with one hundred and forty-two (142) 44.1% respondents of polytechnics in Osun State.

Table 4.3: What are the available ICT facilities for lecturers to use in polytechnics?

Availability of ICT Facilities	**YES**		**NO**	
	Frequency	***Percentage***	***Frequency***	***Percentage***
ICT Center	300	93.1	22	6.9
Computers	290	90.1	32	9.9
Digital Electronic Board	37	11.4	285	88.5
Projector	50	5.5	272	84.4
Computers connected with Internet in the Polytechnic	30	9.4	292	90.6
Printers	50	15.5	272	84.4
Television and Radio	78	24.2	244	75.8
TOTAL	**322**	**100**	**322**	**100**

Table 4.3 above presents the opinion of lecturers who form the sample of the study. Respondents who showed there are ICT centers in their polytechnics were three-hundred (300) 93.1%, while twenty-two (22) 6.9% respondents said there are no ICT centers in their polytechnics. This concludes that majority of the colleges have ICT centers. Respondents who indicated computers are available in their polytechnics were two-hundred and ninety (290) 90.1%, while Respondents who showed there are no computers in their polytechnics were thirty-two (32) 9.9%. This showed that majority of the ICT centers have computers. Also, respondents who said there are electronic boards in their polytechnics were thirty-seven (37) 11.4%, while those who said there are no electronic boards were two hundred and eighty-five (285) 88.5%. This indicated that majority of the colleges does not have electronic boards.

Respondents who showed there are projectors in their polytechnics were fifty (50) 5.5%, while those who showed there are no projectors were two hundred and seventy-two (272) 84.4%. This concludes that majority of the ICT centers does not have projectors. Respondents who showed there are computers connected with internet in the colleges were thirty (30) 9.4%, while two hundred and ninety-two (292) 90.6% said there are no computers connected with internet. This indicated that majority of the polytechnics does not have internet services in their ICT centers.

Respondents who showed there are printers in their polytechnics were fifty (50) 5.5%, while those who said there are no printers in their colleges were two hundred and seven two (272) 84.5%. This concludes that majority of the ICT centers do not have printers. Also, respondents who said there are television and radio were 78 (24.2%), and two-hundred and forty-four (244) 75.8% of the respondents said there are no television and radio in their polytechnics. This concludes that majority of the ICT centers do not have television and radios. This study revealed that ICT facilities are not available in the polytechnics, only computers, televisions and radios are available but internet services and other ICT facilities are not available for lecturers' utilization.

Table 4.4: What are the ICT facilities utilization among lecturers in polytechnics?

Availability of ICT Facilities	**YES**		**NO**	
	Frequency	***Percentage***	***Frequency***	***Percentage***
Do you have ICT center your school?	300	93.1	22	6.9
Are lecturers free to use ICT centers for research purpose and preparation for lectures?	250	77.6	72	22.4
Does the ICT centre have attendant that help in printing or locating other things in the center?	150	46.5	172	53.5
Do you have an email address?	318	98.7	4	1.3
Do you give assignment using ICT?	70	21.7	252	78.3
Are internet services always available in the center?	121	37.5	201	62.4
Is the generator being put in use whenever there is no electricity?	87	27.0	235	73.0
TOTAL	**322**	**100**	**322**	**100**

Table 4.4 above presents lecturers responses that form the sample of the study. On the issue of lecturers ICT center in their polytechnics, three hundred respondent (300) 93.1% said they have ICT centre in their polytechnics, while twenty-two (22) 6.9% said they don't have ICT centers at their polytechnics. This concludes majority of the polytechnics have ICT centers. Two-hundred and fifty (250) 77.6% of the respondents said they are free to use the ICT centre while seventy-two (72) 22.4% said they are not free to use the centre. This showed majority of the lecturers are free to use ICT centers. One-hundred and fifty (150) 46.5% of the respondents said the ICT centre have attendants that help in printing or locating other things, while (172)53.5% one-hundred and seventy-two said there are no attendants in the ICT centre. This shows that majority of the ICT centers does not have attendants in the ICT center.

Three-hundred and eighteen (318) 98.7% respondents said they have an e-mail address, while (4) 1.3% four of the respondents said they don't have an e-mail address. This concludes that majority of respondents have email address. Seventy (70) 21.7% of the respondent said they give assignment using ICT while (252) 78.3% said they don't give assignments using ICT. This concludes that majority of the respondents do not give assignment using ICT. One-hundred and twenty-one (121) 37.5% said internet services are available, while two hundred and one (201) 87 27.0% of the respondents said internet services are not available. Eighty-seven (87) 27.0% of the respondents' said generator is being put on to use in the ICT centre when there is no electricity while two-hundred and thirty-five (235) 73.0% said the generator is not being put on when there is no electricity. This concludes that generators are not put in use when there is no electricity. Based on the table above, the findings of this study revealed that 'YES' frequencies are lower than the 'NO' frequencies. Therefore, ICT facilities are not adequately utilized among lecturers for effective instructional delivery despite the availability of the ICT centres in the polytechnics.

4.4 Discussion of Findings

This study investigated the nature of Information and Communication Technology literacy level, availability and utilization among lecturers of polytechnics in Osun State. In addition, the study examined gender influence on lecturers ICT literacy level. Other aspects investigated by the study were the availability and utilization of ICT facilities in polytechnics in Osun State for effective instructional and learning delivery. Therefore, the discussions of results are systematically treated as follows:

The first research question was analyzed using frequency distribution table. The research question is “what is the ICT literacy level of lecturers in polytechnics in Osun State?”. The result of the study found out that lecturers’ ICT literacy to be high. Omawumi, Oludare and Solomon (2012), in their study of Information and Communication Technology literacy of lecturers in selected Lagos State higher institutions revealed that aggregately large proportions of the teachers are Information and Communication Technology literate. The findings of Otunla (2013) are also similar to the findings of this study in which he examines information literacy skills of university lecturers in relation to ICT tools and resources that are applicable to faculty development such as; e-learning, e-mail communication, interactive multimedia, electronic discussion groups, discussion forum and emerging technologies. Findings revealed higher information literacy skills among university lecturers in information literacy skills of tool, resource, research and publishing. Findings further imply that participants are technologically-capable in line with UNESCO ICT Competency Standards for Teachers as participants reported effective use of most of the computer-mediated professional development modes.

The second research question: “what are the ICT facilities available for use among lecturers in the delivery of effective learning instruction in polytechnics in Osun State?”. The result of this study shows that ICT facilities are not available in the colleges for use among lecturers. The findings of this study are similar to the findings of Akuegwu, Ntukidem and Jaja (2017) in which their study investigated Information and Communication Technology (ICT) facilities utilization for quality instruction service delivery among universities lecturers in Nigeria, with focus on Akwa Ibom and Cross River States. Results obtained revealed that availability of ICT facilities for quality instructional service delivery in Universities in Akwa Ibom and Cross River States, Nigeria is significantly low except internet-connected desktop computers and institutional cyber cafes. The

study of Egomo, Enyi and Tah (2012) is also consistent with the findings of this study. Their study investigated the accessed, availability and degree of utilization of ICT tools for effective instructional delivery in tertiary institutions in Cross River State. The results obtained revealed that availability and utilization of ICT tools for effective instructional delivery is significantly low.

The third research question: "what are the ICT facilities utilization among lecturers for effective instructional delivery. The findings of the study revealed that there is inadequate ICT utilization among lecturers. The study of Azuh and Ndidi (2013), agreed with the findings of this study in which they examined the academic staff challenges to effective utilization in teaching and learning of agricultural education in federal universities in south east geopolitical zones of Nigeria. The findings revealed a low extent utilization and inadequate Information and Communication Technology tools/literacy among the academic staff in the federal universities in south east geopolitical zone. Onasanya, Shehu, and Ogunlade (2011), their study is similar to the findings of this study in which they investigated science and health education teacher's awareness and extent of utilization of information communication technologies. It also examined the relationship between awareness, extent of utilization and teachers' gender. Their level of utilization of ICT resources was also found to be very low. Akindoju, Nwagwu, (2014) also agreed with the findings of this study in which they determined the extent to which ICT resources are adequately provided and utilized by computer science lecturers for instructional delivery in Nigerian tertiary institutions. The finding shows that ICT resources are not adequate and many of the educators rarely use the available ICT resources for relevant instructional delivery. Suggestions were made for improvement.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the findings of this study are summarized, conclusions are drawn, and relevant recommendations are made based on the findings of the study. This study investigated the ICT literacy level of the lecturers and students, and the availability and utilization of ICT facilities for effective instructional and learning delivery, Also the study investigated the influence of gender in relation to the lecturers and student ICT literacy levels in polytechnics in Osun State suggestions for further studies are also provided.

5.2 Summary

The following summary of the findings will meet the purpose of this study, and close the gap in literature concerning the information and communication technology literacy level, availability and utilization among lectures and students in polytechnics in Osun State. Based on the results obtained from the summation of the responses of the respondents, the main findings of the study are summarized as follows:

i. The result of this questions was analyzed using frequency distribution table and the result shows that the ICT literacy level of lecturers is high with 93.8% of the lectures having different levels of ICT literacy and only 6.2% of lectures have no competence in ICT literacy. It also found out that only eight lecturers were in advanced level.

ii. The result was analyzed using frequency table which showed that yes frequencies are higher than no frequencies. Therefore, there is inadequate ICT facilities for lecturers

effective instructional delivery. Only computers are available. The internet, projectors and other ICT facilities are not available.

iii. The result was analyzed using frequency table which showed that yes frequencies are higher than no frequencies, therefore, there is significantly low level of ICT utilization among lecturers.

5.3 Conclusion

The conclusion that could be drawn from the results obtained from this study is that: The ICT literacy levels of the lecturers in the selected polytechnics in Osun State is high with 93.8 of the lecturers having different levels of ICT. This shows that the lecturers are meeting the challenges of utilizing modern ICT facilities in their teaching and learning process. It was found out that there is lack of available ICT facilities in the ICT centres of the polytechnics for lecturers' effective instructional delivery. The most common facilities are computers, televisions and radios, but internet services, projectors and other ICT facilities are not available. The study also revealed low level of ICT facility utilization among lecturers and there are inadequate ICT facilities in the polytechnics for lecturers' effective instructional delivery. It was also found out that availability of ICT facilities for quality instructional delivery among students is significantly low. Except computers, televisions and radios, majority of the ICT facilities are not available.

5.4 Recommendations

Based upon the data collected and analysis of this study, several conclusions had been revealed, and the following recommendations are based upon the result of this research and will hopefully guide other investigations.

i. Since the ICT literacy levels of the lectures were found to be high, lecturers should utilize available ICT facilities in their respective polytechnics to the fullest. Also, the lectures should be engaged in higher ICT literacy training to improve their ICT literacy because most of the lecturers were in know the basic level.

ii. The study revealed non-availability of ICT facilities among lecturers in the polytechnics. Government should therefore provide teachers with the necessary ICT facilities so as to encourage more teachers access to computer technology the present and future use.

iii. The study revealed low level of ICT utilization among lecturers in the polytechnics. It is therefore, recommended that ICT facilities installation and monitoring committee should be set-up in higher institutions to ensure the maintenance and repair of broken ICT facilities for effective ICT utilization.

5.5 Suggestions for Further Studies

i. The present study was limited to the ICT literacy level of lecturers, availability and utilization in the polytechnics of Osun State. It is therefore, suggested that similar studies be conducted in other zones of the country. This will enable a comparison of the findings between the various zones so that appropriate measures can be taken to bridge the gap.

ii. The study should be conducted in states colleges of education to see if the findings of this study are consistent in all the polytechnics. This may serve as basis for depicting their difference with a view to improve their present situation in whatever area they differ.

iii. There is a need to conduct a follow up study of this nature at least five years later with a view to update the government and various polytechnics on the nature of ICT literacy level of their lecturers.

References

Abdullahi, M. (2010) Information Technology: The current strategy for effective science and technology instructions. A paper presented at the 19th National Convention of the Nigeria Association for Educational Media and Technology Held at Ibadan, Oyo State.

Abdullahi, M. (2010) Indispensability of using information technology in the processes of teaching and learning in Nigeria. A paper presented at the National Conference. Organized by the School of Arts and Social Sciences, Kano State College of Education, Kano.

Abubakar, M. K. (2010). ICT knowledge and skills among students of library and information science in Umaru Musa Yar'adua University, Nigeria. *The Information Manager, 10*(1&2), 40. http://ijedict.uw.edu//viewarticlepdf

Adedeji T. (2011). Availability and use of ICT in south-western Nigeria colleges of education. *International Multi-disciplinary Journal Ethiopia, 22*(5). http://dx.doi.org

Adetimirin, A. (2012). ICT literacy among undergraduates in Nigerian universities. *SOURCE Education & Information Technologies.* http://ijedict.uw.edu//viewarticlepdf

Aduwa, S. E., & Iyamu, O. S. (2015). Using information and communication technology in secondary schools in Nigeria. *Educational Technology & Society, 8*(1), 104-112. http://ijedict.dec.uwi.edu?viewarticle.php?id=241

Aina, A. J., Adigun, J. O., & Ogundipe, T. C. (2010). Information and communication technology resource support availability, utilization and proficiency skills among university libraries: The Lagos State University Experience. *Asian Journal of Information Technology, 9,* 248-253. DOI: 10.3923/ajit.2010.248.253

Ajayi G. O. (2012) African response information and communication technology revolution. *ATPS Special Paper*, 8. http://ejds.org/meeting/2003/ictp/papers/ajayi.pdf.

Akinola, C. I. (2015). The challenges of reform and information and communication technology in business education, curriculum and information technology. In Business Education Book of Readings. (1)5. 174-194. https://www.google.com/searchq=akinola

Akuegwu, B. A. Ntukidem E. P. (2007). Impact of information and communication technology on teaching and learning ability of education students in Edo State University of Nigeria. Available: www.antiessays.com/free/ICTineducation-ICTuse-and491482htm

Akuezuilo, (1993). *Research methodology and statistics.* Awka Nigeria, Nuelcent (Nig.) publishers.

Anene, J. N., Ikerionwu J. C., & Danladi, N. (2013). Student-teachers knowledge and acquisition of computer in sandwich programme of University of Abuja, Nigeria. *International Journal for Cross-Disciplinary Subjects in Education (IJCDSE), 4*(4).

Anunobi, V. N. (2014). Information and communication technology literacy level among student-teachers in universities in North Central Nigeria. *Journal of Education and Practice, 5*(39). Available: www.iiste.org

Archibong, I. A., Joseph, E. & Anijaobi-Idem, O. F. (2010). ICT competence among academic staff in universities in Cross Rivers State, Nigeria. *Computer and Information Science,* 3(4). Available: www.ccsenet.org/cis

Bandele, S. O. (2017). *Development and communication technology (ict) and computer applications.* Ado-Ekiti: University of Ado-Ekiti Press. www.ncsu.edu/tas11.2-7pdf

Bichi, M. Y. (2014). *Introduction to Research Methods and Statistics.* Printed and Published by Debis-Co Press & Publishing Company, Kano.

Daniels, J. S. (2012). "Foreword" in information and communication technology in education: A curriculum for schools and programme for teacher development. Paris: UNESCO. http://www.unescobkk.org/index.php?id=981

De Watteville, A., & Gilbert, L. (2010). *Advance information and communication technology.* Oxford: Heinemann Educational Publishers. http://www.ecs.soton.ac.uk/people/lg3/publications/creators_name

Emmanuel, N. (2015). Reforms in information and communication technology: challenges and implications to business educators. In: Akinola, C. I. (Ed) Business Education Book of Readings. 1(5). 2-8

Eruanga, C. B. (2015). The challenges of reforms, information and communication technology: its impacts on the secretarial profession. In: Akinola, C. I. (Ed) Business Education Book of a Readings. 1(5). 193-210. Available at: Federal Ministry of Education (FME) (2004). Ministerial initiative on e-education for Nigerian educational system. Abuja: NERDC Press.

Federal Government of Nigeria (1998). National Policy on Education (3rd Ed) Lagos NERDC http://www.gov/docs/policy/nigitpolicy.pdf

Federal Government of Nigeria (2001) Nigeria National Policy for Information Technology (IT) Retrieved From http://www.gov/docs/policy/nigitpolicy.pdf

Federal Ministry of Education (FME) (1988). Report on National Policy on Computer Education. Lagos: NERDC Press. Press http://www.gov/docs/policy/nigitpolicy.pdf

Federal Republic of Nigeria (2004) National Policy on Education, Lagos, NERCD Press http://www.gov/docs/policy/nigitpolicy.pdf

Gambari, A. I. & Okoli, A. (2017). Availability and utilization of ICT facilities in higher institution in Niger State, Nigeria Inform. N*igerian Educational Technology Journal* www.cekinfo.uk/images/frontimages/gallery/vol.2no/6pdf

Gay, G., & Blades, R. (2015), The impact of ICTs in education. The case of university of Macedonia students. *Journal of Business Case* www.cluteonline.com/journals/indexphp/JBCS/article/viewfile/4765/4855\

Jebba, A. M. (2012). Survey of accessibility and usage of information and communication technology among students of technical education in tertiary institutions in Niger State, Nigeria. *Journal of Educational and Social Research*, *2*(7).

Kwacha, P. Z. (2017). The imperative of information and communication technologies for teachers in Nigerian higher education. *Merlot Journal of Online Learning and Teaching. 3*(4). www.rusnauka.com.3.ANR2013

Maddison, j. (1982) *Information Technology and Education.* The Open University press. Milton Keynes.

Moursund, D. G. (2015) Introduction to information and communication technology in education, http://uoregon.edu/moursund/books/faculty.html.

National Commission for Colleges of Education (NCCE, 2002) minimum academic standard of education. http://www.nceonline.org

Obeng, T. K. (2014). The practical application of ICT in education. Results from a worldwide educational assessment. *Computer and Education*; 37: 163—178. http://www.itnetwork.org.uk/56.htm

Olakulehin, F. K. (2017). Information and communication technologies in teacher training and professional development in Nigeria. Online Submission Volumes 133 at NOUN. Ed. http://scholar.google.com/citations

Oliver, R. & Towers, S. (2010). Benchmarking ICT literacy in tertiary learning settings. *The African Symposium: An online Journal of the African Educational Research Network. 76*(11). http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.17.8052&rep=rep1&type=pdf.

Ololube, N. P. (2017) The impact of professional and non-professional teachers' ICT competencies in secondary schools in Nigeria. *Journal Of Information Technology Impact, 6*(2) http://www.ied.edu.hklapfsit/v/ololubepdf

Ololube, N. P., Ubogu, A. E., & Ossai, A. G. (2017). ICT and distance learning education in Nigeria: A Review of Literature and Accounts. *International Open and Distance Learning (IODL) Symposium* http://www.ied.edu.hklapfsit/v/ololubepdf

Olumorin, C.O. (2018). Lecturers attitude to competence in and use computer in Kwara State Nigeria. Unpublished Ph.D. Thesis submitted to the Department of Science Education, University of Illorin.

Onasanya, R. A., Shehu, O. O., Ogunlade, A. L., & Adefuye, J.O. (2011). Teacher's awareness and extent of utilization of information communication technologies for effective science and health education in Nigeria. *Singapore Journal of Scientific Research, 1:* 49-58. http://scialert.net/abstract/?doi=sjsres.2011.49.58

Otunla, A. O. (2013). University lecturers' information literacy skills in relation to computer mediated professional development in South West and North East Nigeria. http://cisdijournal.net/uploads/V4N3P11-CISDIOtunla

Philip, A., Adeniran, F. & Oluwatolani, I. (2010). An evaluation of the impact of ICT diffusion in Nigeria's higher educational institutions. *Obafemi Awolowo University. Nigeria Journal of Information Technology, 10*(1). 25-35. www.scholar.oauife.edu.ng/arantipublications/exports/rtf

Rafiu, O. (2011). Levels of participation in ICT training programmes, computer anxiety and ICT utilization among selected professionals in Olabisi Onabanjo University, Ago-Iwoye, Nigeria. *International Journal of Education and Development. (IJEDICT),* 7(2). 15-26

Solomon, O. M., Makinde, O. & Oludare, A. (2012). ICT literacy Level of lecturers in selected Lagos State Higher Institutions, Nigeria. *African Journal of Teacher Education Standard Abuja NUC.* http://journal,libouguliph.ca/index/php/ajote

Tonubari, J. C. (2012). A study of computer literacy among trainee teachers in a Nigerian university of education - Port Harcourt. *An International Journal by Global Educators for All Initiative. Global Voice of Educators,* 1(1). http://globaleducators.org/downloads/global_voice_of_educators/Journal%202012%20-%2012.pdf

UNESCO (2012) Information and Communication Technology in Education A Curriculum for Schools and Programme for Teacher Development. Paris: UNESCO http://www.unescobkk.org/index.php?id=981

UNESCO (2014). The plurality of literacy and its implications for policy and programmes. UNESCO education sector position paper. Paris: UNESCO. http://www.unescobkk.org/index.php?id=981

UNESCO (2018). ICT Competency Standards for Teachers. Paris: UNESCO United Nations Millennium Declaration (2015). ICT Focused Regional Human Development Report (RHDR). http://www.unescobkk.org/index.php?id=981

Weert, T. J. (2010). A Model Syllabus for Literacy in Information Technology for all Teachers. In Ennals, R. Gwyn, R. And Zdravchev, I. (1986) Information Technology and Education. The Changing School. 67-83. Chichester, Ellis Horwood Limited.

Wiske, M. S. (Ed.). (2010). *Teaching for understanding: Linking research with practice.* San Francisco: Jossey-Bass.

Yusuf, M. O. (2014). Integrating ICTS In Nigerian Tertiary Institutions. *The African Symposium: An Online Journal of Africa Education Research Network,* 5(2), 42-50 http://www.ncsu.edu/aem/TA55.2/T

Yusuf, M. O. (2012). Information technology: New dimensions to the development of teacher education programme in Nigeria. *Nigeria Journal of Computer Literacy, 4*(1) http://www.ncsu.edu/aem/TA55.2/T

Yusuf, M. O. (2015). Information and communication technology and education: Analyzing the Nigerian national policy for information technology. *International Educational Journal, 6*(3): 316-321. http://www.ncsu.edu/aem/TA55.2/T

Zorkoczy, P. (2010). *Information Technology an Introduction.* London Pitman. 17 (3): 14-21.

APPENDIX

QUESTIONNAIRE ON:

LITERACY LEVEL, AVAILABILITY AND UTILIZATION OF INFORMATION AND COMMUNICATION TECHNOLOGY AMONG LECTURERS OF POLYTECHNICS IN OSUN STATE

Dear respondent,

This instrument is developed to collect data on ICT literacy level, availability and utilization among lecturers of polytechnics in Osun State which is part of a research work to satisfy part of the requirements for the award of National Diploma of the Department of Library and Information Science, Kwara State Polytechnic, Ilorin. It is in the light of the above I solicit for your kind cooperation and assistance towards the success of the study by answering the questions on this questionnaire to the best of your knowledge. The information to be provided will be used for research purposes only. Responding to the question could be by putting a tick in the box provided after the question to indicate your reaction and write short notes where ever necessary.

OLANIYAN, James Oluwayomi

Researcher

SECTION A: BACKGROUND INFORMATION

1) Name of the Polytechnic …….

2) Gender: Female [ ]; Male [ ]

SECTION B: ICT LITERACY

Instruction: Please tick the column that best suits your level of competency in ICT literacy in all the sub-sections the response modes are: Advance (A), Moderately Skilled (MS), Know the Basic (KB) and No Competence (NC).

1. BASIC COMPUTER OPERATIONS

S/N	ITEMS	A	MS	KB	NC
1.	Connecting Hard Ware				
2.	Start a computer				
3.	Apply a pass word to lock or open a computer				
4.	Identify and use icons				
5.	Start an application and create a document				
6.	Display the directory of a disc				
7.	Shut down a computer				

2. HARDWARE AND SOFT WARE OPERATIONS

S/N	ITEMS	A	MS	KB	NC
1.	Adequate keyboard and mouse skills				
2.	Deleting and copying				
3.	Cutting and pasting				
4.	Inserting and removing a removable disc				
5.	Create name and rename a file or a folder				
6.	Sending file or folder to another computer				
7.	Copying from a computer to a disc				

3. COMPUTER NETWORKING

S/N	ITEMS	A	MS	KB	NC
1.	Search internet for information that is for study or school work.				
2.	Use a computer for e-mailing or communicating with colleagues.				
3.	Using voice or video chat such as Skype to communicate with people online.				
4.	Ability to access and search a website and to use internet-based services such as discussion format, Facebook, and e-mail.				
5.	Use software to analyze student achievement/performance data.				
6.	Using internet o search for books and journal, and save them in the computer.				

7.	Use printer to print information from the internet.				

4. BASIC ICT OPERATION

S/N	ITEMS	A	MS	KB	NC
1.	Use word processing software to write documents.				
2.	Use spreadsheet to draw a graph or perform Calculations.				
3.	Use Computer to organize and manage your work.				
4.	Use mathematic, language, or other learning programs on a computer.				
5.	Create presentations for school projects.				
6.	Using spreadsheets and database software for data manipulation and statistical analysis.				
7.	Using projectors for teaching and learning.				

5. BASIC ICT UTILIZATION

S/N	ITEMS	A	MS	KB	NC
1.	Ability to use appropriate aids such as presentation graphs, charts and maps.				
2.	Assessing a software designed for teaching.				
3.	Preview and grade a power presentation.				
4.	Assess and grade student's assignments and exam online.				
5.	Evaluate the use of a software designed for teaching.				
6.	Knowing about how to collect and retrieve information.				
7.	Using computer to add content to and make simple changes to existing information.				

SECTION C: AVAILABILITY OF ICT FACILITIES

Instruction: Please indicate the type of ICT facilities that are available in your college

S/N	ITEMS	TICK
1.	Computers	
2.	Digital electronic board	
3.	Projectors	
4.	Computers connected with internet in the college	
5.	Examination scoring machine	
6.	Television and Radio	
7.	ICT laboratory	
	Others…….	

SECTION D: ICT UTILIZATION

S/N	ITEMS	YES	NO
1.	Do you have ICT centre in your school?		
2.	Are lecturers free to use the ICT centre for research purpose and preparation of lecture?		
3.	Does the ICT centre have attendants that help in printing or locating other things in the centre?		
4.	Do you have an e-mail address?		
5.	Do you give assignments through ICT?		
6.	Are internet services always available in the centre?		
7.	Is the generator being put in use whenever there is no electricity?		